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THE PRESENT POSITION OF CHEMOTHERAPY BY DRUGS OF THE SULPHANILAMIDE GROUP

THE BACTERIOLOGICAL AND EXPERIMENTAL ASPECT*

BY

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The cure of experimental streptococcus infections by drugs of the sulphanilamide group marks an epoch in the progress of chemotherapy begun by Ehrlich and Shiga in 1904. It is not surprising that the initiative in this work has always come from the laboratory, since it is only by the use of small animals that the essential desideratum of large numbers of infected individuals showing a relatively uniform and progressively fatal disease can readily be secured. In them the assessment of therapy is conclusive, death or survival being the criterion. A great difficulty, of course, is the transfer of results from one animal species to another or to man, as different hosts may vary either qualitatively or quantitatively in their behaviour both to the pathogenic agents and to the drugs. Nevertheless, the essential basis for the clinical use of compounds of the sulphanilamide class must continue to be their performance under experimental conditions; hence it is fortunate that observations with bacterial infections in mice should have proved so accurate a guide to the successful treatment of corresponding conditions in man. In giving an account of the subject I shall try to select from the voluminous literature what presents a fair general perspective, and shall speak in the light of unpublished work done jointly with Dr. J. V. M. Robb† and Miss M. W. Leckie, B.Sc., during the past three years.

Historical

Morgenroth and Levy in 1911 cured a general infection with pneumococci in mice by means of optoquine, although apparently results were uncertain and the drug was rather toxic for use in man. Before Domagk reported the discovery that the azo "prontosil" dyes of Mietzsch (1938) and Klarer could cure a general infection with streptococci, it was known that by applying suitable antiseptics early enough to the site of inoculation the progress of an infection due to these organisms could be prevented. It must be emphasized, however, that the general infection caused by intraperitoneal inoculation with streptococci was controlled by injecting prontosil subcutaneously. Thus it is not necessary for this drug, as it were, to chase up the organisms: cure occurs when the two meet in the tissues, having come from opposite directions. The Tréfouëls, with Nitti and Bovet, then simplified remarkably the position as regards the chemical constitution of effective drugs by showing that one moiety of prontosil—namely, the long-known compound *p*-aminobenzenesulphonamide (sulphanilamide)—also has a curative action. This substance, which is colourless, water-soluble, and comparatively little toxic for mammals, contains sulphur in the form of a sulphonamide group (SO_2NH_2). It is not known whether the sulphur atom is indispensable for the chemotherapeutic property, but, so far, no compound showing activity comparable to that of sulphanilamide has been described which does not contain sulphur in some form. Therapeutically active substances exist, however, such as the diphenyl sulphones, which it is difficult to conceive as being converted into sulphanilamide or yielding identical derivatives *in vivo*.

Sulphanilamide and Streptococci in Mice

The test infection is with a culture of streptococci highly virulent for mice: such streptococci are rare; only one was obtained among over fifty strains from human lesions.‡

The intraperitoneal inoculum consists of an overwhelming dose which in untreated animals causes septicaemia and death within twenty-four hours. The drug may either be injected subcutaneously or introduced into the stomach. In order so far as possible to secure uniform and uncomplicated conditions we have adopted the subcutaneous method, and a spacing of doses similar to that originally used by Buttle *et al.* (1936)—an injection at the rate of 0.01 gramme for a 20-gramme mouse being given at the time of inoculation, followed by a second of 0.0066 gramme four to five hours later, and a third dose of the same amount after twenty-four hours; animals of 19 to 25 grammes weight were used.

With an inoculum consisting of about one hundred times the number of organisms certainly fatal within twenty-four hours, this treatment is by no means surely curative. Death often occurs from septicaemia after an interval of three or four days, or longer. Again, some animals which appear to have been cured die after many weeks from streptococcal septicaemia. The tendency to relapse which is so marked in infections with

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† Working as a Muirhead Scholar and with the support of the Medical Research Council.

‡ This strain, from a carbuncle of the neck, also a culture for which we are indebted to Dr. Adolf Feldt, Berlin, have been chiefly used for our experimental work. The former is slightly more virulent for mice; but the therapeutic results are similar with both.

protozoa and spirochaetes has also been noted by others in streptococcus infections treated by sulphanilamide, and it was recorded by Bordet in rabbits infected with streptococci and treated by antiserum. Buttle *et al.* (1936) found that several different serological types of streptococci were influenced.

Similar treatment with sulphanilamide of an infection with pneumococci in mice, say of Type I—of the same severity as that with the streptococcus, so far as can be judged by the time taken to produce a fatal septicaemia after inoculation—leads to a much smaller proportion of cures. We attempted to better the results by continuing administration of 0.0066-gramme doses once daily; but in spite of this the animals succumbed to septicaemia in several days during the treatment. Accordingly infection with the pneumococcus is less amenable than that with haemolytic streptococci: this is general experience.

Drugs More Effective than Sulphanilamide

In the hope of improvement the abundant possibilities presented by synthetic derivatives of sulphanilamide and related compounds have been widely examined by Buttle, Fourneau, and others. It has been found with certain of these substances that streptococcus infection in mice is influenced by a smaller amount, being also a smaller fraction of the tolerated dose as compared with sulphanilamide (this dose, however, may be difficult to fix with the relatively insoluble compounds, whose low toxicity may be chiefly due to slow absorption). Further, their action on pneumococcus infections is more marked. Among these may be mentioned *p-p*-diamino-diphenyl sulphone (Buttle *et al.*, 1937b), rodilone (*p-p*-diacetyl-diamino-diphenyl sulphone) tested by Fourneau *et al.*, corresponding monoacyl derivatives—for example, the monoacetyl compound*—and Whitby's (1938) "May & Baker No. 693" (M & B 693) (a sulphanilamide derivative introduced on account of its activity against pneumococcus infection). As tested by subcutaneous injection in mice infected with streptococci, we have found monoacetyl *p-p*-diamino-diphenyl sulphone to be the most effective of the last three. It has shown a similar behaviour with a Type I pneumococcus. The mere statement of these results, however, leaves many points unsettled. For instance, do the more efficient compounds simply persist longer in the body and so maintain, as by a depot, a more continuous action than sulphanilamide, which is very rapidly excreted, or, other things being equal, are they (or still more active derivatives formed *in vivo*—although there is no experimental proof of such) actually more potent? At present it is not possible to give an answer, since there are wide gaps in knowledge. Again, the distribution of sulphanilamide in the body and secretions is traced by means of colour reactions given by the amido side chain, but nothing is known of the behaviour of the sulphonamide group.

We examined the effect of varying the time between the injection of the drug and subsequent inoculation with streptococci. Conceivably such an experiment might yield results pointing to an optimum interval, which would indicate that the streptococci were most efficiently dealt with either when they met a maximum concentration of the drug in the tissues (the maximum in the blood occurring in mice one hour after either a subcutaneous injection or administration per os of sulphanilamide—Feinstone *et al.* (1938); Marshall *et al.* (1938)) or when enough time had elapsed for some alteration to occur in the circulating drug or in the tissues. Accordingly a single subcutaneous dose of sulphanilamide, rodilone, or the monoacetyl derivative was given approximately five hours, three and a half hours, one hour before, or simultaneously with, an intraperitoneal injection of streptococci. Untreated animals infected with one-hundredth of the inoculum used in the therapeutic experiments died from septicaemia in twenty-four hours. Under these conditions sulphanilamide merely delayed death for a day or thereby. With the two other compounds, especially the monoacetyl derivative, a considerable proportion of cures resulted, but no marked difference was observed according to the above-mentioned intervals before inoculation at which the drugs were injected. It should be noted that these two substances, being little soluble, are administered as a fine suspension and are relatively slowly absorbed.

In the case of drugs which act well when injected in a finely divided state, solubilized derivatives in similar doses have been found less effective. Thus, different compounds of the series vary in their therapeutic efficacy, and this depends, in part at least, on their solubility; and other physical properties such as diffusibility probably have an influence. Whether differences in chemical constitution in the series influence therapeutic action in other ways is uncertain, but this seems likely.

Influence of the Individuality of the Host

It must be strongly emphasized, however, that the individual animal is a most important factor in modifying results; this is true even when, as Buttle *et al.* (1936) rightly insist, all are infected at one time with the same culture. Both with sulphanilamide and other members of the group full dosage has failed to effect cure in certain mice, whereas among those which received only a sixth or a tenth some were cured, although all had been similarly inoculated and otherwise treated. Also, animals inoculated with a certain number of streptococci and receiving a given dosage of drug may not respond better than those which have been infected with thirty or a hundred times as many organisms but similarly treated. These unavoidable irregularities have rendered much quantitative work inconclusive.

Effect of Sulphanilamide Drugs on Various Infections in Mice and in Other Species

Successful results have been recorded by various workers in the treatment of other experimental infections in mice—for example, with meningococci (Buttle *et al.*, 1936; Proom, 1937), certain salmonella and coliform bacilli (Buttle *et al.*, 1937a; Mayer, 1938); but not others (Gross *et al.*, 1938b). These organisms tend not to be highly virulent, and the device has been employed of introducing the inoculum along with mucin into the peritoneum. Staphylococcus infection, which for its establishment in the mouse usually requires large inocula along with mucin, has not proved highly susceptible to the sulphanilamide drugs. In controlled experiments, however, with the compounds sulphanilamide, uleron, M & B 693, rodilone, and the monoacetyl derivative, the last three were the most effective against staphylococci† (P. Browning, unpublished). It was also found, similar to the observation of Buttle (1937), that infection may persist in the track of the inoculating needle and lead to local suppuration, with death of the animal from general infection some weeks after treatment. *B. welchii* infection responds well according to Long and Bliss (1937a), provided the inoculum does not contain too much exotoxin; Natvig (1938) met with failure, however. Infection with pasteurella organisms was little influenced (Buttle *et al.*, 1937a); but Schütze obtained favourable results in rats and

* We are indebted to Imperial Chemical Industries, Ltd., for some of these compounds.

† We are indebted to the Wellcome Laboratories for the culture used.

mice infected with *B. pestis*, especially with M & B 693. *Treponema pallidum* in rabbits was not affected (Campbell, 1937).

In other species of hosts also success has attended treatment—for example, in general streptococcus infection of rabbits and guinea-pigs; streptococcal pleurisy in rabbits, by Gay and Clark (1937) (but poor results were obtained by Nicholson (1938), who, however, began treatment relatively late and used small dosage); intradermal infection of rabbits with pneumococci (Kreidler, 1937); and spontaneous "sniffles" pneumonia in rats (Maier, 1938.) Certain virus diseases have responded to the sulphanilamide drugs—experimental meningitis due to the virus of lymphogranuloma inguinale in mice, also distemper in dogs. In the latter it is not clear whether the virus itself is influenced or the associated bacterial infection. In general, virus diseases have proved resistant (McKinley *et al.*, 1939). Reports have been contradictory on the effects in experimental tuberculosis in guinea-pigs (Buttle and Parish, 1938). For the sterilization of brucella infection in guinea-pigs doses of sulphanilamide approaching the toxic limit were needed (Wilson and Maier, 1939). Much remains to be done, however, on dosage and on the response of various infections in different hosts to drugs of the series other than prontosil and sulphanilamide.* There is general agreement that little or no effect is exerted on diseases due to exotoxins—for example, of *B. diphtheriae*, *B. tetani*, *V. septique*, *B. histolyticus*, staphylococcus, etc. (Levaditi and Vaisman, 1938; Gross, Cooper, and Lewis, 1938)—or on the action of such exotoxins as can be demonstrated *in vitro*—for example, streptococcus haemolysin and fibrinolysin (Huntington, 1938; Gross *et al.*, 1938a), or on the formation of streptococcus erythrogenic toxin (Huntington, 1938) or leucocidin (Gay *et al.*, 1939) *in vitro*.

The infections which have proved tractable in most cases are of the acute generalizing or diffuse type, when treatment is begun early after inoculation. Where focal lesions have been a feature, especially when of some duration, treatment has often been less effective—for example, streptococcal lymphadenitis of guinea-pigs (Seastone, 1937; Habs and Bader, 1938) and intradermal streptococcus infection of rabbits (Kolmer *et al.*, 1938); also in naturally occurring mastitis in cows (Hoge *et al.*, 1939). In mice, too, this has been noted: Berger (1937) injected streptococci subcutaneously and began prontosil treatment by mouth, either simultaneously or five hours later; while the occurrence of septicaemia was regularly prevented, local lesions tended to develop or spread. Clinical observations have corresponded—for example, those of Lockwood *et al.* (1938) in surgical conditions and Longcope (1938) in tonsillitis.

Other Factors that may Limit the Efficacy of Treatment

Dosage of the inoculum, other things being equal, is important; with a given virulent culture of streptococci a small inoculum is more easily overcome by the drug than a large one. The statement has been made, however, that infections due to highly virulent streptococci are more tractable than those caused by strains of less virulence. But it is by no means clear that virulence of the causal organism *per se*, as measured by the size of the certainly fatal inoculum, determines the responsiveness of the infection. Further, apart from the suggestive experiment of Maclean *et al.* (1939) with the pneumococcus, it has not been proved that unsuccessful treatment may lead in a virulent strain of organisms to the development of marked resistance to the therapeutic agent, similar to the drug-fastness of trypanosomes. The evidence is not convincing in favour of specificity, in the sense of one drug acting better on infection with one species of organism while another compound is more effective against another, although Whitby (1937) has recorded observations in this sense with streptococci and meningococci.

Mode of Action of Sulphanilamide Drugs

Attempts to explain the mode of action of the sulphanilamide drugs have not led to concordant results, but the problem is clearly one of wide importance in view of the variety of infections which are influenced. The chemotherapeutic property of prontosil could not have been discovered except by trial in infected subjects, because the drug lacks antiseptic action in the test-tube. But in the case of sulphanilamide certain observers noted that *in vitro*, provided the number of organisms used as the inoculum was small enough, streptococci were inhibited or even killed by considerable dilutions of the drug in ordinary media, human blood (with leucocytes present or removed), or serum (Colebrook *et al.*, 1936; Buttle, 1937; Hoare, 1938; Britton, 1938). This influence exerted by the size of the inoculum is manifest, however, with various other antiseptics—for example, mercuric chloride or acriflavine (Garrod, 1935; personal observations). The anti-bacterial effect has been held to explain the therapeutic action of the sulphanilamide group. As Levaditi and Vaisman point out, however, far more powerfully antiseptic substances exist which cannot cure a general streptococcal infection. For example, acriflavine, or especially proflavine, is little toxic for the mammalian body while at the same time an enormously more potent antiseptic than sulphanilamide, and its rate of excretion is not significantly different from that of the latter; nevertheless it fails to cure a general infection. Colebrook *et al.* (1936) remark: "It is somewhat surprising that the low bactericidal power of the blood of mice treated with the sulphonamide should be associated with such a notable therapeutic effect." Therefore it must be concluded that the weak anti-bacterial property demonstrable *in vitro* is not likely to be more than a subsidiary factor contributing to the chemotherapeutic action of the sulphanilamide group. We have not detected any noteworthy diminution in virulence when streptococci were grown in ox serum (heated at 56° C.) plus a concentration of sulphanilamide as high as 1 in 2,000. Further, no opsonic effect of the drug has been found when in the usual phagocytic experiments it was added in concentrations of 1 in 5,000 to 1 in 40,000 to a mixture of heated serum, organisms, and leucocytes, although this has been claimed (Finkelstein and Birkeland, 1938). Levaditi and Vaisman concluded that endotoxins of various organisms, although antagonized *in vivo*, were not destroyed *in vitro* by the addition of sulphanilamide compounds. Gay *et al.* (1939) have made the striking observation that sulphanilamide is not fixed *in vitro* by large masses of streptococci; this contrasts with what occurs in the case of bacteria or protozoa and other compounds which are lethal for the organisms *in vitro* or *in vivo*. Accordingly, test-tube experiments do not, so far, supply data which enable the curative action of sulphanilamide drugs to be assessed.

The problem remains as to whether, when an infection is cured by these drugs, the organisms are acted on or the host. In the first place, sulphanilamide itself does not set up an anti-bacterial condition of any permanence within the body, for when, subsequent to its repeated adminis-

* The promising field for the combined use of chemotherapeutic agents and antisera is not dealt with here.

tration, inoculation with the organisms is made after an interval of some hours following the last dose, the progress of the infection is less influenced than when similar dosage is given at and after inoculation. Thus a necessary condition for therapeutic action is that the organisms and the drug (or perhaps the active derivative of the latter) shall actually meet in the body of the host. According to the observations of McIntosh and Whitby (1939) sulphanilamide drugs do not stimulate leucocytosis, neither do they influence the quality, quantity, or rate of formation of specific antibodies to pneumococci. Long and Bliss (1937b) and Mellon *et al.* (1938), in order to examine the events following treatment, inoculated mice intraperitoneally and, after allowing time for the organisms to proliferate, then administered the drug. A difficulty in this form of experiment is to influence the infection sufficiently. We proceeded as follows:

Mice were saturated so far as possible by adding rodilone in very fine suspension to their food. Animals which ate freely for a week were inoculated intraperitoneally with 0.25 c.cm. of a 1 in 10 dilution of a virulent twenty-four-hours broth culture of streptococci—over a million times the certainly fatal dose; at the same time a subcutaneous injection of sulphanilamide was given. The inoculated mice were examined at intervals, films and cultures being made from the peritoneal contents.

We found in confirmation of Mellon that no dramatic occurrence took place in the peritoneum; certainly phagocytosis, though seen, was not a striking feature.

Films of peritoneal contents showed the usual appearances which in human material characterize an acute inflammatory exudate proceeding to resolution—chiefly polymorphs at first, with the presence of large mononuclears in greater numbers later. But in uninoculated animals similar films, made by pressing a microscope slide against the visceral peritoneum, showed both types of cells; also in the infected animals the exudate was scanty. Accordingly, no very great abnormality was detected in the cells of the peritoneum of infected-and-treated animals. It is noteworthy that after upwards of twenty-four hours a small loopful of the peritoneal exudate of these mice yielded an abundant growth of streptococci, although in the direct films they appeared scanty. Several animals which continued to be fed with the drug for a week after inoculation remained well during this time, but when treatment was then stopped they died about a week later from streptococcal septicaemia.

Although the heavy dose of virulent organisms had been almost completely suppressed, the body was not sterilized,* and any immunity which developed was not sufficient to delay for long the recrudescence of the infection. The culture recovered from one of these animals when tested for virulence was found to be distinctly attenuated as compared with that originally used for inoculation—a result which may be adequately accounted for by the influence of the tissues after the initial action of the drug. In the case of intraperitoneal inoculation with pneumococci, McIntosh and Whitby have demonstrated that successful treatment with M & B 693 does not prevent initial invasion of the blood stream. Their finding that in treated animals the capsules of pneumococci in the peritoneal cavity show changes of the nature of defect is, on the analogy of *B. anthracis*, what would be expected when conditions are unsuited for continued proliferation and the development of pathogenic properties. In fact, the events occurring in the course of cure of various infections by sulphanilamide drugs resemble strikingly those observed by Preisz (1909) in immunized animals inoculated with virulent anthrax bacilli. Gay *et al.*, in an extensive investigation of possible anti-bacterial properties of sulphanilamide, have failed to obtain results markedly significant of such action.

Accordingly it would appear that while it is under the influence of the drug the body behaves towards particular highly virulent organisms much as the normal body does to those of non-pathogenic type, which are gradually destroyed. Levaditi and Vaisman have reached a similar conclusion from their observation that certain drugs of the sulphanilamide group render mice resistant to various endotoxins—that is, killed cultures of organisms such as gonococci (confirmed by Carpenter *et al.*, 1938), meningococci (questioned by Feinstone *et al.*, 1938; and Gross, Cooper, and Lewis, 1938), *B. aertrycke*, dysentery bacilli, etc. Thus the chief action of the drug would be to alter the reactivity of the host. Such an explanation also fits well the clinical observation in pneumonia that the first and most striking effect of the treatment is reduction of the pyrexia. Of course, it is impossible to exclude some gradual direct action of the drug on the organisms' metabolism taking place in the infected animal, according to the hypothesis of McIntosh and Whitby, who found that successful treatment does not prevent an initial multiplication of the inoculum. However, there is little positive evidence to support this as yet. The failure of the sulphanilamide drugs to influence an infection in mice with *Trypanosoma equiperdum* (Buttle, *et al.*, 1936) or *T. brucei*, which pursues a course similar to that with the streptococcus, or the more chronic *T. congolense* infection, even when treatment is intense and prolonged (P. Browning, unpublished), makes unlikely any universal tissue reaction such as stimulation of the reticulo-endothelial system. Histological evidence also has been said to afford no support for such stimulation. But this does not exclude the participation of the usual cellular defensive mechanisms in conducing to cure by means of those drugs.

Practical Conclusions

1. While cure of certain experimental general infections with bacteria by sulphanilamide compounds is an enormous advance, the efficacy of the present drugs is by no means ideal. So far at least as mice are concerned, sulphanilamide is surpassed by, for example, M & B 693, rodilone, and especially the related mono-acetyl *p-p*-diamino-diphenyl sulphone. But with them all the range of effective dosage is not wide, and treatment to be most successful must be begun early.

2. Further work on the absorption and excretion of members of the series, and on the chemical transformations which they may undergo in the body, as well as clinical observation, is required in order to enable them to be used to the best advantage as regards the choice of drug, and the dosage in amount and spacing in time. For instance, in treating infection of the meninges by oral or subcutaneous administration it will probably be found that one which rapidly attains a high concentration in the cerebrospinal fluid, such as sulphanilamide, ought to be given in the first place, while more potent but more slowly absorbed compounds, provided they ultimately reach the spinal fluid in sufficient amount, are used to reinforce and maintain the action.

3. Where conditions favourable to general infection have arisen prophylactic use of the sulphanilamide group should be valuable. Where infection has been established the best therapeutic effects are secured in acute, diffuse condi-

* MacCallum and Findlay (1938; and personal communication from Dr. Findlay), in the case of mice infected with the virus of lymphogranuloma inguinale, found the virus particles still present in the brain after successful treatment with sulphanilamide.

tions without marked local tissue changes. Hence these drugs are not likely to obviate operative procedures where focal lesions such as accumulations of pus or extensive necrosis of bone or other tissues have occurred. Accordingly, powerful antiseptics which act when brought into close contact with the organisms locally, and which are relatively harmless to the tissues, will continue to be required also in the treatment of many septic infections.

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(A full list of references to earlier work will be found in Findlay's *Recent Advances in Chemotherapy*, second edition, London, 1939, and in Mellon, Gross, and Cooper's *Sulfanilamide Therapy of Bacterial Infections*, Baltimore, 1938.)

The International Council of Ophthalmology met in London at the Royal Society of Medicine on April 19, 1939, when there were present Messrs. Nordenson (chairman), Ehlers (honorary secretary), Pflüger (honorary treasurer), Paton, v. Grosz, Cavara, Terrien, MacCallan, Bailliart, Löhlein, Knapp, Tooke, Sinclair. The treasurer reported that the assets of the council amounted to 2,232 Swiss francs. The president announced that the German Government had accepted the responsibilities undertaken by the former Austrian Government with regard to the next congress. Professor J. Meller of Vienna was nominated president of the next congress, and the following topics were chosen for discussion: (1) Plastic operations on the eyeball; (2) The pathology of retinal detachment, including the biology and pathology of the vitreous body. It was decided to lay before the next congress the question of internationalizing the determination of the axes of astigmatism. The next meeting of the council will be held in Paris in 1940 on the day before the opening of the annual meeting of the Société Française d'Ophtalmologie.

PHARMACOLOGY OF THE SULPHANILAMIDE GROUP OF DRUGS*

BY

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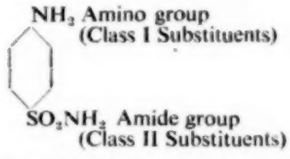
The Drugs and their Uses

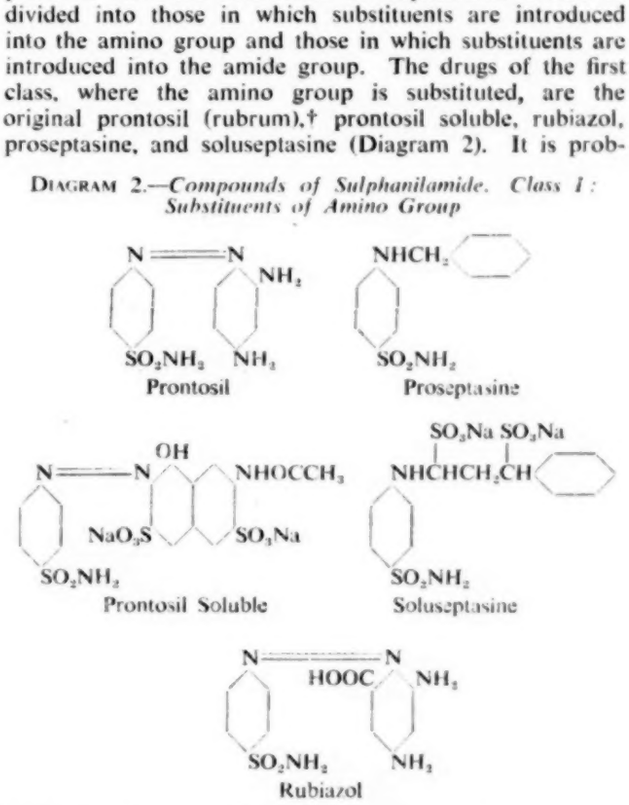
The drugs now in general use for the chemotherapy of bacterial infections are sulphanilamide and certain of its derivatives, notably 2-sulphanilylaminopyridine (M & B 693). Sulphanilamide consists of a benzene ring to opposite ends of which are attached an amino group and a sulphonamide group (Diagram 1). From the chemical

DIAGRAM 1.—*Sulphanilamide*



point of view the derivatives of sulphanilamide can be divided into those in which substituents are introduced into the amino group and those in which substituents are introduced into the amide group. The drugs of the first class, where the amino group is substituted, are the original prontosil (rubrum),† prontosil soluble, rubiazol, proseptasine, and soluseptasine (Diagram 2). It is prob-

DIAGRAM 2.—*Compounds of Sulphanilamide. Class I: Substituents of Amino Group*



able that all these substances owe their activity to their splitting up in the body into sulphanilamide and an inactive substance, although this cannot be regarded as finally proved.

Class 1 Compounds

Fuller (1937) showed that after the administration of prontosil rubrum and prontosil soluble large amounts of sulphanilamide were excreted in the urine. His work

* Read at a joint meeting at the Annual Meeting of the British Medical Association, Aberdeen, 1939.

† Prontosil rubrum was the original material discovered by Domagk. Prontosil album is the name given to one of the brands of sulphanilamide or *p*-aminobenzenesulphonamide.

does not prove that prontosil rubrum owes its activity to the sulphanilamide liberated, but makes it probable. Domagk (1936, 1937a, 1937b), on the other hand, disagrees with this view, as the therapeutic activity of prontosil rubrum in the mouse is greater than would be accounted for by the sulphanilamide it contains; this difficulty may possibly be due to differences in the rate of elimination of the substances. Another anomaly is that some authorities, notably Colebrook and Purdie (1937), consider that the prontosil dyes may be superior to sulphanilamide in clinical treatment of streptococcal infections: this clinical observation is at present difficult to correlate with the other available data.

With regard to proseptasine, Lockwood (1939) and Molitor and Robinson (1938) have shown that when it is given to mice in therapeutic doses a concentration of sulphanilamide amounting to 4 mg. per 100 c.cm. can be detected in the blood, and, further, that the therapeutic effect of proseptasine can be imitated by giving small doses of sulphanilamide adjusted so as to maintain a concentration of this order. Proseptasine has been used on a very large scale owing to its low toxicity, which is in part due to the poor absorption of the compound; in animal experiments some 80 per cent. of the drug given is found unchanged in the faeces. It should be emphasized that it is not a suitable drug for cases of severe or resistant infections. It appears that sometimes such patients have been treated with this drug and have not recovered, when they might possibly have been saved if a more potent remedy, like sulphanilamide or M & B 693, had been used.

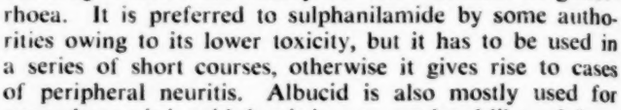
Rubiazol, another drug of this group, is a dye like prontosil rubrum, with an added carboxyl group. It seems to be broken down in the body slightly more slowly than prontosil itself, thus being milder in action. The drug has been widely used in France, and little or no sign of toxicity has been reported. Soluseptasine and prontosil soluble are intended for parenteral administration, which is necessary only where oral treatment is impossible. In these circumstances large quantities of these preparations have to be injected—for example, about 60 c.cm. of either would be equivalent to 3 grammes of sulphanilamide, which is a small daily dose. About 120 c.cm. daily would be required for the treatment of a severe infection. The preparations are excreted very rapidly, and injections must be given at close intervals if treatment by this route has to be continued.

The activity of this class of substances, where the amino group of sulphanilamide is substituted by other groups, is no greater than, and in some cases is not so great as, that of sulphanilamide itself. Their toxicity is correspondingly reduced with their activity. Thus proseptasine can be given to animals in very large doses, and is definitely less toxic than sulphanilamide in patients; owing, however, to the small concentration of sulphanilamide liberated it will not deal with such severe infections as sulphanilamide itself.

Class II Compounds

The drugs of the second class of sulphanilamide derivatives, where substituents are introduced into the amide group, are uleron, albucid, and M & B 693 (Diagram 3). Unlike the substances of the first class, these do not appear to be broken down to sulphanilamide in the body, but probably are themselves the active agents. One of them, M & B 693, has a range of activity which is definitely greater than that of sulphanilamide. Uleron is said to be more active than sulphanilamide in staphylococcal and gas-gangrene infections (Domagk, 1937a). These observations have, however, so far remained unconfirmed, and the drug is now used mostly for the treatment of gonorrhoea. It is preferred to sulphanilamide by some authorities owing to its lower toxicity, but it has to be used in a series of short courses, otherwise it gives rise to cases of peripheral neuritis. Albucid is also mostly used for gonorrhoea; it is said that it is not acetylated like sulphanilamide in the body and therefore does not become partly

DIAGRAM 3.—*Compounds of Sulphanilamide. Class II: Substituents of Amide Group*



Uleron Albucid M & B 693

inactivated. It seems to be of extremely low toxicity; indeed, no toxic symptoms have been noted, and good results in gonococcal cases have been obtained when it is given with the usual adjuvant treatment (Harkness, personal communication). In streptococcal infections in mice, however, it has very little activity, so that it would seem unlikely to prove useful for this condition.

M & B 693 represents a considerable advance in chemotherapy with these compounds. It is active against all types of pneumococci, whereas sulphanilamide is effective only against Type III. Good results in pneumonia have now been reported by a number of authors (Agranat, Dreosti, and Ordman, 1939; Evans and Gaisford, 1938), and there are accounts of success in pneumococcal meningitis (MacKeith and Oppenheimer, 1939; May, 1939; Raman, 1939; Reid and Dyke, 1938; Robertson, 1938). Experimental work has shown that some strains of pneumococci are resistant (Maclean, Rogers, and Fleming, 1939); these do not belong to any one serological group. A further observation of great interest is that susceptible pneumococci can be rendered resistant by successive passage through treated mice (Maclean, Rogers, and Fleming, 1939). Staphylococcal infections in mice are influenced by M & B 693 more than by sulphanilamide (Bliss and Long, 1939; Whitby, 1938b), and there are a few reports of cures of clinical staphylococcal septicaemic conditions (Fenton and Hodgkiss, 1938; Bliss and Long, 1939); the advantage of the compound in staphylococcal infections is not so great as in the case of pneumococcal infections, but it is undoubtedly the best drug to use for these cases.

In meningococcal meningitis clinical reports (Bryant and Fairman, 1939; Somers, 1939) indicate that it is very active, but no comparison with sulphanilamide has as yet been made. In experimental streptococcal infections it is as active as sulphanilamide (Whitby, 1938a, 1938b), or a little more active, but there are as yet no clinical reports in which the two drugs are compared. In clinical gonococcal conditions it is more active than sulphanilamide (Lloyd, Erskine, and Johnson, 1938); a greater percentage of cases respond, and it appears to be effective without adjuvant treatment. A few successful cases have been reported where there has been a previous failure with sulphanilamide (Lloyd, Erskine, and Johnson, 1938). In experimental infections with *Vibrion septique* and *B. welchii* our preliminary experiments indicate that it is more active than sulphanilamide, although the effect is even better when combined with serum treatment. In plague (Schütze, 1939), and in malaria due to *Plasmodium knowlesi* (Chopra and Das Gupta, 1939), there is experi-

mental evidence of its activity, and a temporary improvement has been obtained in cases of infective endocarditis (Whitby, 1938b).

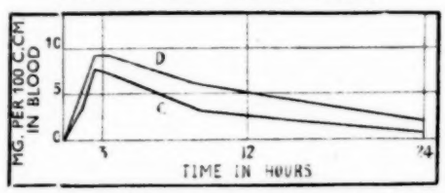
It thus appears that M & B 693 is effective whenever sulphanilamide is effective and is also active in certain conditions where sulphanilamide fails. It is probably the drug of choice for any severe case of pyrexia where the bacteriological diagnosis is doubtful (Whitby, 1938b); also it is the most potent one in pneumococcal, staphylococcal, and gonococcal infections. When the condition is known to be a streptococcal or meningococcal infection it is still an open question as to whether sulphanilamide or M & B 693 should be used. Both drugs are known to be active experimentally, and it would seem to be necessary to await a prolonged clinical comparison before coming to any decision. A consideration of toxic symptoms may well decide this point, and up to the present M & B 693 has not been in use long enough to make sure of all its possibilities in this direction.

There is another active group of chemical substances —4:4'-diaminodiphenyl-sulphone and its derivatives (Buttle *et al.*, 1937; Fourneau *et al.*, 1937a). These are not related to sulphanilamide, and, although very active, they are not at present of much clinical interest owing to their toxicity. One of them, the diacetyl derivative (Fourneau *et al.*, 1937b), is marketed under the name of rodilone. It is of very low toxicity and has been found a useful compound in gonorrhoea, but owing probably to the slow liberation of the active substance the free diamino compound, it is not to be recommended for severe infections. One of these compounds, a soluble derivative in which the amino groups are combined with glucose, has given very satisfactory results in trachoma; a solution of the drug is applied locally under the eyelids (Burnet, Cuénod, and Nataf, 1939a, 1939b).

Absorption and Excretion

The absorption and excretion of these drugs has been studied fully only in the case of sulphanilamide itself, but some data are available for other compounds. Sulphanilamide is absorbed very rapidly when taken by mouth; the concentration in the blood is maximal in about three hours, thereafter falling gradually to zero in the course of the following twenty-four hours (Marshall, Emerson, and Cutting, 1937a) (Diagram 4). The drug is absorbed entirely

DIAGRAM 4.—*Absorption of Sulphanilamide (Marshall, Emerson, and Cutting, 1937a)*



C = 0.05 gramme per kilo (normal subject). D = 0.066 gramme per kilo (case of renal damage).

from the small intestine and not from the stomach. It is very readily diffusible and finds its way rapidly into all secretions and tissues of the body in almost equal concentrations; the concentration in bone and fat is, however, less than elsewhere. The concentration in the cerebrospinal fluid is nearly as great as that in the blood. There appears to be no good evidence that the drug fails to reach the fluid in diseased conditions, although the concentration is found to be very variable from patient to patient (Banks, 1938), a factor which will probably be even more noticeable with M & B 693. The drug seems to be selectively absorbed on to the corpuscles of the blood, for the concentration here is 50 per cent. greater than that in the plasma (Hansen, 1939). About 20 per cent. of the drug in the blood is in the acetylated inactive form, and in some cases this proportion may be as high as 40 per cent. These differences do not seem to be correlated with the therapeutic efficiency of the drug in different subjects (Hansen, 1939). Sulphanilamide is excreted partly as the free base and partly in the inactive acetyl form (Marshall, Emerson, and Cutting, 1937b); the rate of excretion is slower in subjects with renal damage (Marshall, Emerson, and Cutting, 1937a). So far as can be ascertained at present the drug does not undergo any other change in the body; for 90 per cent. of the total sulphanilamide given to mice can be found in the urine either as sulphanilamide or as acetyl sulphanilamide (Marshall, 1939). In the urine the acetyl form accounts for over 50 per cent. of the total sulphanilamide, and the rate of excretion follows the urine flow, not the concentration in the plasma. The explanation of this seems to be that the drug is reabsorbed in the kidney tubules, after filtration through the glomeruli (Marshall, Emerson, and Cutting, 1937b). The dependence of the rate of elimination on the urine flow makes it possible to wash out the drug by promoting diuresis.

In order to obtain the best therapeutic effect it appears to be necessary to maintain a constant concentration of the drug in the blood. It is clear from the chart that doses administered four-hourly to six-hourly are sufficient to do this. When the drug is given in daily divided doses it is found that it reaches its maximal concentration in about two days, and a similar time elapses after the drug is withheld before the last traces disappear from the blood. A blood concentration of 10 mg. per 100 c.cm. is required for the treatment of severe infections, and this is obtained by a dosage scale of 1 gramme per day to 20 lb. (Long and Bliss, 1937a, 1937b) of body weight—that is, about 7 grammes for an average 10-stone man. Children require 50 per cent. more than this and infants three times as much (Banks, 1938).

M & B 693 is absorbed and excreted more slowly than sulphanilamide in animals (Marshall, Bratton, and Litchfield, 1938). It reaches the cerebrospinal fluid, but more slowly than sulphanilamide (Baines and Wien, 1939; unpublished observations from this laboratory). In cases of severe meningitis treated with M & B 693 it might be well to give an initial dose of sulphanilamide to obtain a rapid effect in the cerebrospinal fluid. M & B 693 is excreted in the urine partly as the free base and partly in the inactive acetylated form. The sodium salt of M & B 693 is very soluble and is more rapidly absorbed than the free base; it is very alkaline in solution—about *p*H 11. It has been used successfully for intramuscular injections or intravenously (diluted to 5 per cent. or 1.5 per cent.) when oral treatment is impossible owing to vomiting (Marshall and Long, 1939). This procedure will usually be necessary only for the initial treatment; if it has to be continued it would be necessary to give injections at frequent intervals—for example, four-hourly to six-hourly—owing to rapid elimination. As the material is still only in the experimental stage it must be emphasized that owing to its rapid absorption it is likely to give rise to toxic symptoms unless small quantities are employed for each injection—for example, 3 c.cm. of the 33 per cent. solution; only about half the quantity of drug used for oral treatment is required (Banks, 1939). The dose scale recommended for M & B 693 is about the same as that for sulphanilamide. For cases of pneumonia Whitby (1938a) recommends 5 grammes in the first twelve hours, followed by 1 gramme four-hourly for a period of

a week. This gives a blood concentration of about 8 to 10 mg. per 100 c.cm. As there is evidence that pneumococci can become insensitive to the drug after prolonged treatment (Maclean, Rogers, and Fleming, 1939), it would appear better to use a high concentration of this order than a low concentration for long periods.

It has been observed that the drugs do not work very well when there is considerable tissue breakdown due to suppuration—as in streptococcal or gonococcal cases with abscesses; the drugs are not, therefore, a substitute for surgical procedures in these cases. This may be due in part to the organisms being inaccessible to the drug, but it is also probably due to the breakdown products of the tissues stimulating bacterial growth and making the organisms less susceptible to attack by the drug. In this connexion it is of interest that peptone will reduce the effect of the drugs when added to blood in *in vitro* experiments (Lockwood, 1938). The bacteria themselves do not absorb large quantities of these drugs from solutions in which they are suspended, as is the case with trypanosomes and the arsenical drugs. No work has as yet been done on the concentration of the drugs inside the bacteria, but it is evident that the concentration is probably of the same order as that in the surrounding medium.

Toxic Symptoms

One of the most important points for the clinician is the variety of toxic symptoms that may occur in treated patients. In animals it is mostly the acute toxic symptoms which have been described; these consist entirely of nervous symptoms—a paralysis with incoordinate movements in the case of sulphanilamide, and in the case of M & B 693 and the sulphones a state of hyperexcitability with convulsions (Marshall, Bratton, and Litchfield, 1938). In patients, on the other hand, these acute toxic symptoms have not been observed, the doses of the drugs being proportionally very much smaller. A number of more chronic toxic symptoms are described. These, however, are rarely referable to the nervous system, and the more dangerous states are all accompanied by alterations in the blood cells.

By far the commonest symptom in the patient is the so-called cyanosis or blueness of the skin. This is not associated with respiratory distress, and investigations have shown that it is not necessarily accompanied by a change in the condition of the blood pigment. It seems more likely that it is due to the formation of a pigment in the body from condensation products of the drug itself (Marshall and Walzl, 1937), and it is generally considered that it is not a symptom which should deter the physician from further administration of the drug. Sulphaemoglobinaemia and methaemoglobinaemia (both intracorpuscular) occur, but neither has given rise to serious conditions. Sulphaemoglobinaemia is due to the union of intestinal H_2S with the haemoglobin, a reaction which is catalysed by sulphanilamide; it is to be avoided by withholding purgatives except very mild ones like liquid paraffin, and by giving a low-residue diet excluding eggs (Archer and Discombe, 1937; Paton and Eaton, 1937), and it is now an uncommon occurrence. Methaemoglobin causes no trouble, as it is rapidly reconverted into haemoglobin on cessation of treatment. Nausea with epigastric pain, and occasionally vomiting, are symptoms produced by sulphanilamide. These often appear during the first day or two of administration and subsequently disappear, so that they can also be neglected in most cases where there is an indication to continue the drug.

Drug fever may occur seven to twelve days after the drug has been started; the temperature may rise to 102°, and it is sometimes accompanied by a rash on the exposed parts of the body. The fever disappears as soon as the drug is withdrawn. This symptom may easily be confused with a recrudescence of the original infection, although usually the latter will occur after the drug has been withheld (Colebrook and Purdie, 1937). It has been suggested that this fever may be caused by liberation of the lysed products of the bacteria.

Rash occurs in about 6 per cent. of cases (Hageman and Blake, 1938). It may be purpuric, scarlatiniform, morbilliform, or maculo-papular, and the distribution may be general or patchy. Occasionally it is accompanied by itching. A very rare condition of exfoliative dermatitis has been described. The rash disappears rapidly when the drug is withheld. Nervous symptoms may arise. Depression, headache, and dizziness are common, especially in ambulant patients. Depression seems to be worse with M & B 693 than with sulphanilamide. Palpitation, paraesthesia, tinnitus, and peripheral neuritis also are seen; the last-mentioned symptom is very rare with sulphanilamide, but has often occurred with uleron. Aspermia is sometimes met with in gonococcal patients, but this has now been shown to be of no importance. Symptoms of acidosis have been reported as the result of sulphanilamide. A dose of 1 or 2 grammes per kilo in animals causes a definite but slight decrease of blood *p*H and a diminution of alkali reserve together with an increase of the urinary *p*H. This is thought to be due to interference with the reabsorption of bicarbonate in the kidney tubules (Marshall, Cutting, and Emerson, 1938). Sulphanilamide causes a considerable increase in the urinary excretion of porphyrin (Rimington and Hemmings, 1938), but this does not seem to be associated with any other symptoms. The effect is absent in the case of the derivatives where the amide group is substituted—for example, M & B 693.

Agranulocytosis is by far the most serious condition produced by these drugs. Slight degrees of lymphocytopenia are relatively common, but only fifteen cases of agranulocytosis due to sulphanilamide have as yet been described—nine of them fatal (Jennings and Southwell-Sander, 1937; Johnston, 1938). It may well be that it is commoner than is at present considered, as it is impossible to diagnose the condition unless a blood count is done. Amidopyrine and inorganic arsenicals should not be given at the same time as these drugs, as they also tend to produce this condition. Agranulocytosis seems to be particularly common in cases which have not responded well to the drug. The only symptoms associated with it are intense headache, fever, and a deterioration of general condition. All patients who receive the drugs for more than ten days should have a blood count every third day. This is especially important in patients with continued fever accompanied by a deterioration of the general condition. The treatment of agranulocytosis is by pentnucleotide injections and repeated transfusions. It is better to use heparinized blood than citrated blood for the transfusion as citrate damages the leucocytes (Colebrook and Storer, 1924; Johnston, 1938). The donor may be given an intramuscular injection of nuclein four or five hours before the blood is taken to produce a leucocytosis. Agranulocytosis seems to occur with M & B 693 as often as with sulphanilamide. Up to the present six cases have been reported or are in the course of being reported (Colebrook, personal communication).

Haemolytic anaemia is also a rare condition. Unlike

agranulocytosis it occurs in the first few days of treatment. There is a sudden fall in the number of red cells, and a varying amount of jaundice together with haematuria. No fatal cases are recorded, and as a further test course of the drug given to these patients after recovery fails to reproduce the condition it is possible that it depends to some extent on the presence of the infection.

The most troublesome symptoms with M & B 693 are nausea and vomiting; this is more obvious than in the case of sulphanilamide. M & B 693 is more toxic than sulphanilamide in animals when the blood concentrations of the two drugs are compared (Marshall, Bratton, and Litchfield, 1938), but owing to the slower and less complete absorption of the free base, toxic symptoms, excluding vomiting and mental depression, seem to be no more common than with sulphanilamide. The soluble sodium salt may well give rise to symptoms of toxicity; so far it has not been used on a very large scale.

The administration of large doses of M & B 693 to animals causes the deposition of concretions of the acetyl derivative in the renal tract, more especially in the collecting tubules (Antopol and Robinson, 1939). Several cases of haematuria (Southworth and Cooke, 1939; Marshall, personal communication), presumably due to this cause, have occurred in America. Up to the present there have been no reports of the condition in this country.

Summary

The drugs in general use for chemotherapy of bacterial infections are sulphanilamide and certain of its derivatives —notably M & B 693.

These derivatives can be divided into those in which substituents are introduced into the amino group and those in which they are introduced into the amide group.

The action of these drugs is discussed from the aspects of absorption and excretion and of toxic symptoms.

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ACHLORHYDRIC HYPOCHROMIC ANAEMIA ASSOCIATED WITH PERIPHERAL NEURITIS

WITH REPORT OF TWO CASES

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The association of neurological lesions with certain disorders of the blood is an established fact. The frequency with which organic changes in the spinal cord and peripheral nerves occur in Addisonian (pernicious) anaemia, however, is in pronounced contrast with the apparent rarity of like changes in idiopathic hypochromic anaemia. This is somewhat surprising as there is considerable evidence to show a relation between these two varieties of anaemia (Heath, 1933). Families in which some members were the subjects of Addisonian anaemia and others of hypochromic anaemia are also described (Witts, 1930; Heath, 1933). There is, indeed, some conflict of opinion as to whether affection of the nervous system occurs in association with hypochromic anaemia, as shown by the literature.

Review of the Literature

Whitby and Britton (1937) state that although numbness and tingling of the extremities are not uncommon in hypochromic anaemia, definite lesions in the nervous system are rare. They quote Daniels and Roclofs, who described migraine, disturbances of voluntary movement, and papilloedema as complications of this malady. On the other hand, Wilkinson (1936) asserts that cases of hypochromic anaemia practically never show involvement of the central nervous system or peripheral nerves, while Vaughan (1936) was unable to find any evidence to support the occurrence of subacute combined degeneration of the cord or other organic lesion of the central nervous system in this form of anaemia. Wintrobe and Beebe (1933)

record that paraesthesiae were present in 33 per cent. of their cases, but that the severity of the symptoms rarely attained the prominence encountered in subacute combined degeneration of the cord, and that they more resembled the acroparaesthesia of the menopause. These authors were unable to trace in the literature any undoubted case in which the anaemia was complicated by objective neurological signs. The observations of Bethell, Goldhamer, Isaacs, and Sturgiss (1934) are also in accordance with this latter observation.

Witts (1930) reports the case of a patient with hypochromic anaemia, sore tongue, and achlorhydria who showed weakness of the lower limbs, without ataxia or paraesthesia, and in whom the right ankle jerk and abdominal reflexes were absent. Cases of postero-lateral sclerosis of the spinal cord associated with achylia and hypochromic anaemia are also described by Witts (1930), but he regarded the blood changes as being in a "prepernicious stage" and likely to revert to the true picture of an Addisonian anaemia if treatment had been withheld. Caughey (1936) records an example of a change from hypochromic anaemia to Addisonian anaemia in a patient manifesting signs of involvement of the motor and sensory tracts of the spinal cord. Dameshek (1931) reports a case which exhibited diminution of vibration sense over the right leg. Abramson (1935) found objective neurological changes in several instances: "reduced external sensibility" was found in one; absence of radio-periosteal and triceps reflexes with preservation of the biceps reflex in another; and a third showed signs of involvement of the pyramidal tracts. Following treatment with iron these physical signs resolved. In a series of pathological examinations of the spinal cord in anaemia Weil and Davison (1929) concluded that only in pernicious anaemia are the microscopical appearances of subacute combined degeneration of the cord found, and that anaemia in itself—that is, lack of haemoglobin and oxygen—does not act destructively on the spinal cord. These statements are criticized by Hadden (1936), who points out that the series of cases was too small to warrant such conclusions, and he describes cases in which post-haemorrhagic anaemia gave rise to syndromes in which the spinal cord was affected.

It is of interest to note that mental changes have been met with in association with hypochromic anaemia, the apparent presumption being that the anaemia was the underlying aetiological factor of the psychosis, since the latter disappeared with improvement in the blood picture (Scheid, 1937; Romano and Evans, 1938).

Two personal cases showing objective neurological signs in association with hypochromic anaemia are described below.

Case I

Achlorhydric hypochromic anaemia with peripheral neuritis. A man aged 74 was admitted to hospital on November 30, 1938, suffering from general weakness, and especially weakness of the legs. About two years before he began to complain of substernal pain on exertion as well as after meals, together with fatigue. The pain had improved to some extent, but the weakness had progressed, and his legs became rapidly tired on exertion. His previous illnesses were dysuria, for which prostatectomy was performed in April, 1935, and haematuria in June, 1936, renal calculi being removed from the right kidney by operation. He remained in hospital for seven months, eventually making a good recovery, and had no further symptoms of haematuria, dysuria, or frequency.

Physical Examination.—Moderate development and nutrition, but facies very pale and showing a faintly yellowish tinge; mucosae and conjunctiva also pale. Tongue smooth, with poorly marked papillae. Edentulous. Heart: Apex beat just palpable in fifth interspace in mid-clavicular line, with systolic murmur at apex conducted towards axilla. Pulse regular, full, and average rate of 90. Blood pressure 145/70. Lungs normal beyond slight crepitations at both bases. Abdomen normal apart from operation scars. Nervous system: Pupils very small but equal and regular, with sluggish reaction to light and normal reaction to accommodation. Other cranial nerves normal. Sensation: Vibration diminished in both legs, especially the right, with patchy diminution to pain and loss to cotton-wool over the distal portions of each leg; similar patchy anaesthesia over hands. The arms showed full movement with slight loss of power. Supinator, biceps, and triceps jerks all absent. Legs showed full range of movement, but with deficient power at all joints and slight loss of tone; knee jerks and ankle jerks absent and plantar reflexes flexor. The abdominal reflexes were normal. Co-ordination and sphincters were normal. A blood count showed: haemoglobin, 58 per cent.; red cells, 3,850,000; colour index 0.75 per cent.; no abnormal red cells apart from deficiency in haemoglobin. White cells, 5,500—polymorphs 59 per cent., lymphocytes 32 per cent., large mononuclears 7 per cent., eosinophils 2 per cent. The cerebrospinal fluid was normal in all respects, with two cells per c.mm.; total protein 0.025 per cent.; negative globulin, Lange and Wassermann reactions. Fractional gastric analysis showed absence of free hydrochloric acid and a total acidity of only 0.036 per cent. throughout the two and a half hours of investigation.

There was no lesion to account for a secondary anaemia, and although at times the motions contained a slight amount of blood, this proved to originate from internal haemorrhoids. An *x*-ray examination of the stomach and intestinal tract showed no evidence of abnormality; similarly a barium enema passed rapidly through the colon with signs of early diverticulosis. Sigmoidoscopy gave a negative result.

Subsequent Progress.—He was put on ferri et. ammon. cit. 30 grains thrice daily, and by December 31 his haemoglobin had reached 60 per cent. An examination of the blood on February 10, 1939, gave the following result: haemoglobin, 72 per cent.; red cells, 5,150,000 per c.mm.; colour index, 0.7; white cells, 7,000 per c.mm. No abnormal red or white cells were observed in the blood films. The patient was seen again on May 24, 1939, and had improved considerably. He looked well, and stated that he had no complaints beyond an occasional pain across the small of the back after sitting. Muscular power in the arms and legs was good; in the upper limbs the supinator, biceps, and triceps jerks were all present, only the periosteal radial jerks being absent. Knee jerks were definitely present even without reinforcement, but the ankle jerks were still unobtainable. Sensation was now everywhere normal apart from some diminution of vibration sense over both tibiae.

Case II

Hypochromic anaemia with achlorhydria and peripheral neuritis (mainly sensory neuronitis). The patient was a married woman aged 51 with four children, all alive and well; she had had one miscarriage.

History of Illness.—In 1932 the patient first developed dyspeptic symptoms, and an *x*-ray examination revealed the presence of a gastric ulcer. She was placed on routine treatment and remained well until 1937, when she began to lose weight and to complain of a dull epigastric pain. A further radiological examination was undertaken, and showed an ulcer of the perforating type on the lesser curvature of the stomach. She was admitted to hospital, when the haemoglobin content of her blood was found to be 56 per cent. A partial gastrectomy was performed in September, 1937, only two inches of the lesser curvature being left. The pathological report of a section of the resected piece of stomach showed that a columnar-celled carcinoma was present in the ulcer bed. Her recovery from the operation was uneventful, and she continued well until July, 1938, when she began to experience paraesthesia of the upper and lower limbs and some loss of power in the legs. These symptoms

gradually became worse until the date of her attendance at hospital on January 4, 1939.

Physical Examination.—The patient showed marked pallor of the skin and mucous membranes; glossitis of mild degree and koilonychia were present. No abnormality was detected in the thorax; the spleen was just palpable, and the blood pressure was 130/70. Nervous system: The right pupil was smaller than the left, and the reaction to light was diminished as compared with the other pupil. Other cranial nerves were normal. In the upper limb all the reflexes were present, but were more pronounced on the left side. The knee and ankle jerks were present and equal, and the plantar responses were flexor. There was no loss of power in the muscles of the upper limbs, but in the legs there was a generalized diminution of muscular strength. Co-ordination and sphincters were normal. The examination of sensation revealed some absence of appreciation of cotton-wool in all four limbs, involving the distal halves of the forearms and legs; there was also "blunting" to pin-prick over the same areas. Vibration sense was much diminished in the right leg and to a lesser degree in the left, but was normal in both arms. Pronounced hyperaesthesia to deep pressure in all four limbs was found.

Subsequent Investigations.—Wassermann and Kahn reactions negative. Blood counts: (*a*) January 12, 1939—red cells, 3,470,000 per c.mm.; haemoglobin, 58 per cent.; colour index, 0.85; white cells, 8,400 per c.mm. (*b*) February 15—red cells, 4,540,000; haemoglobin, 62 per cent.; colour index, 0.69; white cells, 10,400. (*c*) March 5, 1939—red cells, 4,560,000; haemoglobin, 84 per cent.; colour index, 0.9; white cells, 7,500. A gastric analysis after a test meal (March 16) showed no free hydrochloric acid in any of the specimens of gastric fluid. The result of *x*-ray examination (March 14) showed that, although the stomach emptied rapidly at first, there was still a small residue four hours after ingestion of the barium.

Subsequent Progress.—The patient was placed on one tablet of ferrous sulphate thrice daily, and after a month's treatment the paraesthesia had disappeared. Periodic examination showed a gradual improvement of sensation, and in April, 1939, the only sensory abnormalities were a loss of sensation to cotton-wool over the terminal phalanges of the fingers. The reflexes of both upper limbs were now equal and the spleen was no longer palpable. By May, 1939, all sensation was normal.

Discussion

The first case presents several unusual features. It has been observed by many authorities that the age incidence of idiopathic hypochromic anaemia is strikingly constant, the great majority of cases occurring between 40 and 50 years of age. After the age of 50 the condition is uncommon, and it is distinctly rare in the sixth decade. Its occurrence in individuals over the age of 70, however, has been recorded by Haden (1932). The incidence of the disease in females far exceeds that in males, although the latter are by no means exempt (Witts, 1930; Haden, 1932). The question arises as to whether the anaemia in Case I can be designated "idiopathic," since two possible sources of chronic haemorrhage are present which might account for the anaemia. One of these sources can be eliminated, since no haematuria was observed subsequent to the operation of 1936. The possibility of loss of blood from leaking haemorrhoids, however, cannot definitely be excluded, and a chronic haemorrhage from this site has to be considered as the underlying cause of the hypochromic anaemia.

Anaemia as a sequel of gastrectomy is not an uncommon event. In all of Morley and Roberts's (1928) cases the anaemia was of the hypochromic type. Our second case appears to be a typical example of this group. The marked improvement in the anaemia was accompanied by parallel improvement in the neurological signs, and while the latter mainly consisted of sensory changes and were consequently dependent on subjective sensations, there appeared to be no reason to doubt the evidence of the patient's observations, and she was not in the least a hysterical subject.

Two factors are common to both cases: (*a*) a hypochromic anaemia; (*b*) achlorhydria. Douthwaite (1936) suggested the term "gastrogenous polyneuritis" for the clinical syndrome of multiple neuritis associated with gastric dysfunction. While it has been recognized for many years that faulty functioning of the stomach is often associated with morbid changes in the peripheral nerves, it is not clear whether all such cases have a common aetiology. Douthwaite considered that the neuritis might be "dependent on an adequate supply of neuropoietin or some allied substance from the gastric or duodenal mucosa." Recently, much attention has been directed to the part played by possible vitamin B deficiency in polyneuritis, and Ungley (1938) and Laurent and Sinclair (1938) record examples of polyneuritis with gastric abnormality in which the vitamin B concentration of the blood was low and the response to vitamin therapy was pronounced. Hartfall (1934), in an extensive study of anaemia occurring subsequent to gastric operations, was impressed by the inadequate dietary in many cases, and particularly by the low content of vitamin B; he also emphasized the importance of rapid gastric evacuation and small intestinal hurry, both of which would tend to diminish absorption. Sinclair (1938) found low values of vitamin B in the blood of some cases of idiopathic hypochromic anaemia, and he suggests that this result is probably due to an impaired absorption consequent on the achlorhydria present, or to actual destruction of the vitamin in the stomach. He also mentions the relation between vitamin B and normal blood formation.

From a consideration of the above facts it would appear that the two cases we report could be classified as examples of gastrogenous polyneuritis. The criteria of this latter disorder, however, are not sufficiently restricted to warrant such affections being included under the one heading, and while the term "gastrogenous polyneuritis" may be of some value for clinical description, it is reasonable to assume that the underlying aetiology is not necessarily the same for all cases, and that future research will subdivide this group according to the underlying cause. The changes in the peripheral nerves described in association with pernicious anaemia and the concomitant achlorhydria could equally well be included under this category as an example of a gastric dysfunction coexisting with polyneuritis.

The importance of the hypochromic anaemia in our cases is difficult to assess. The anaemia may be coincidental with the changes in the peripheral nerves or may be a basic factor in the causation of the condition. In both cases iron medication was the only therapeutic measure adopted, and the response of the neurological signs was so pronounced as to suggest at least an association between the iron deficiency and the neuritis. It might be argued that the improvement in the patients' general condition was accompanied by an increase in appetite and that the augmented intake of food provided some factor the deficiency of which was responsible for the nervous lesions. An inquiry into the dietaries, however, revealed little discrepancy in the quality and quantity of the food before and during treatment. Since the vitamin B content of the blood was normal, there does not appear to be any reason why a deficiency of this principle should be responsible.

Summary

Two cases showing objective neurological changes are described.

Hypochromic anaemia and a disturbance of gastric function were common to both cases.

The possible aetiology is discussed.

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RHEUMATISM AND CLIMATE

BY

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Rheumatic diseases are prevalent in North Europe, particularly in countries bordering on the North Sea, and to a less degree in Japan, North China, South-East Australia, Tasmania, and New Zealand, where climatic conditions approach those of Britain. The incidence of such disease diminishes progressively with the increase of tropical conditions from latitude 50° to that of 20°, being severe in latitude 50°–40°, not common in 40°–30°, rare in 30°–20°.

Rheumatic fever is reported to be unknown in hot tropical regions where there is no seasonal change of climate—for example, in Perak, Singapore, Central America, West Indies, Nigeria, and Gambia. Cases, however, are known to occur in the Punjab. In hospitals in New Orleans the incidence of mitral stenosis (rheumatic in origin) is stated as one-twentieth of that in Boston hospitals, while in Miami 1.3 per cent. of heart disease is reported as rheumatic in origin, in England about 32 per cent. In Switzerland, in the lower Alps, rheumatism is common; not so in the high Alps, where the dry cold and sunny and relatively calm atmosphere have curative effects. In Finland the greatest amount of rheumatic troubles is in the south-east; there are few cases in the open and colder regions of the north, although lakes and rivers are there abundant.

In a temperate climate such as Massachusetts one in ten of the inhabitants over 40 years of age are reported as suffering from rheumatism, and one in four of those of 70 to 80 years. In the U.S.A. there are twice as many cases of chronic rheumatism as of heart disease, ten times as many as of tuberculosis, seven times as many as of cancer.

The financial loss due to rheumatic troubles is enormous. Twenty times more prevalent in the wage-earners than in the propertied class, they affect women nearly two and a half times more than men. Dental infections, tonsillitis, and respiratory infections are frequently associated with rheumatic affections: the last seem to be particularly provocative of rheumatic fever. The influence of herd infection is shown by the experience of the Presbyterian Hospital Training School, U.S.A. A group of healthy young women enter every six months as nurse students. They are carefully examined before and after admission. As the result of three months' work in wards full of patients suffering from severe respiratory diseases these students frequently are affected with sore throats and other respiratory infections, and any old rheumatic troubles are then likely to recrudesce.

Influence of Housing and Working Conditions

G. Edström, investigating the influence of housing and working conditions in Sweden upon the cause of rheumatic diseases, concludes that bad housing and working conditions have a large productive and also a deteriorating effect, for the rate of fully recovered patients is much greater among those who have lived under good or fairly good conditions. "It is nearly as important for the causation and prognosis of the chronic rheumatic infections to make more healthy the environment as to stop the local infection." Poynton likewise had drawn attention to the ill effect of the micro-climate of the house. The quickest reaction from rheumatic conditions, says Neergaard, is brought about by staying in a warm dry region, as in the desert sanatoria in Arizona, or in the high mountain sanatoria in Switzerland, where it is sunny, calm, and dry. In both conditions most of the time can be spent in the open air, where the deteriorating conditions of shut-up rooms do not act.

The influence on mortality of (*a*) social class and (*b*) crowding is shown by the following figures cited by M. Greenwood.

(*a*) In 1930–2 the mortality of the highest social class (males) was 13 per cent. better than the average mortality, while that of the lowest social class was 12 per cent. worse. For wives the respective figures were 19 per cent. better and 13 per cent. worse.

(*b*) For the two worst social classes the worst area had a mortality 50 per cent. greater for males than that of the best, and 47 per cent. for wives. In Durham the cottages in the rural areas are often mere hovels; nevertheless the mortality is 36 per cent. better than that in the county boroughs, and yet educationally and economically the rural folk are just as poorly off as the borough people.

It is noteworthy how sickly-looking people brought into a garden city, such as Letchworth, from some crowded part of London blossom into virile healthy citizens. Many authors regard cold, and above all cold and damp conditions, as causative of rheumatism. As changes of weather are commonly credited with making affected joints ache it is suggested that cold reduces the defensive mechanisms against infection. Against this supposition is the fact that people like the Eskimos and Lapps, greatly exposed to cold and mist, do not suffer from rheumatic troubles. Moreover, civilized people in temperate climates, who suffer from these most, live almost all their lives indoors in badly ventilated, artificially heated, and more or less polluted houses in towns, where the population is dense.

Protective Influence of Open-air Life

The cold and often foggy Arctic regions are among the healthiest in the world. Drift-wood does not decay there, because in these regions microbes and moulds cannot grow in the cold; thus infections do not spread and wounds heal easily. Arctic explorers may sleep out in the wet snow, get their clothes soaked, be chilled, and suffer frost-bite but not catarrh or pneumonia. In Shackleton's expedition of 1914–17, after the ship broke up, in spite of great and continual hardship there was no disease among the crew of fifty-six excepting a little scurvy when fresh meat failed. So, too, with Scott's 1902 expedition, lasting three years; with the same number of crew, often badly clothed and fed, there was no serious illness, no colds, sore throats, or rheumatism, only a little scurvy when fresh food was deficient.

In 1936 the Russian, Dr. Nikitin, with 104 men, lived on drifting ice-floes for between two and three months and endured danger of freezing to death, but no "cold" or "infections" occurred. The Eskimos, uncontaminated by civilization, are very healthy and free from infections and rheumatic troubles, having splendid teeth and no scurvy while fed on their natural diet. Of average height, they are plump but powerfully built, with yellow skin darkened where exposed. Cheerful, hospitable, and kindly, with remarkable powers of endurance, they take great care of their clothing, for this renders them independent of weather and enables them to carry out aquatic hunting. It consists of two layers of fur—seal or reindeer. The air in the interstices of the fur, inside the hairs, and between the two layers of clothing, acts as an insulator and prevents loss of body heat while allowing evaporation of sweat. The well-developed layer of fat beneath their skin acts also as a natural garment; a thick coat of blubber protects warm-blooded whales and seals from ice-cold water. The footwear is made of two layers of fur, and dry grass may be put under the soles and changed each evening, great attention being paid to care of the feet.

Their food consists of raw meat—seal, walrus, whale, reindeer, and bear—fish, and in the summer game and eggs. Liver, blood-soup, and pieces of hide to chew are regarded as delicacies, while maggots growing in meat in summer are eaten raw with relish. Much blubber is consumed, as fat is a concentrated food and has more than twice the heating energy value of dry protein. While largely living on raw animal food, the Eskimos when inland in summer eat berries and the herb angelica. They also consume the paunches of reindeer, containing half-digested moss. No salt is needed with their animal food, while much water is drunk.

In summer the Eskimos dwell in tents made of skins stretched over a framework in double layer, the fur of the inner layer of skin being turned inwards. Such a tent may hold three or four families, each with its own cubicle, in front of which burns a lamp. The lamps when properly attended to do not smoke, and afford both light and heat. There is a hole at the top of the tent, and through this hole the great difference of temperature within and without the tent keeps up a free ventilation. The stench within may, however, be very strong. As the temperature may be 80° to 90° F. the Eskimos go naked indoors. The tents are moved before the surroundings become polluted; dogs act as scavengers, while the outside cold keeps in check all decomposition. For winter they cover the framework not only with skins but with moss, peat, and blocks of snow. When travelling they very quickly build a hut of such blocks cut with their knives. In the centre is a hearth, while a hole in the roof affords ventilation.

The Eskimos are very susceptible to respiratory and other infections as soon as they come in contact with civilized people; they suffer then from tooth decay, tuberculosis, influenza, measles, etc., and particularly so when they change their natural food and dwellings for those of civilization and white men introduce immorality and disease. Normal children taken from Siberia to Moscow did badly; now schools are put up in their birthplace. In Alaska, where hygiene is taught and enforced, Eskimos are doing well, being quick to adopt useful civilized methods. Their fertility is high—for example, 42 per 1,000 in Greenland—and where the struggle to live through the winter is great they kill off the girl infants and practise polyandry. An expectant mother thinks nothing of stopping and giving birth to a baby when out on the ice fields. Hiding it under her fur garment, she hurries on after her people.

The Lapps, about five feet high, are bow-legged, tough, and hardy people. Their clothing, tents, huts, and food are much the same as the Eskimos'. Infants are washed in warm water, at first daily and then occasionally, but never after 2 years of age. Older Lapps wash their hands only; sweating cleans the bodies of Eskimo and Lapp. Cooking-pots are well washed, spoons are licked clean, and knives cleansed by use. The fur bedding is taken out of the tent daily and well aired on the snow. Their food, mostly animal, is eaten raw or dried. They never fry food. Reindeer milk and cheese are taken, and angelica and sorrel in summer. The Lapps also are free from tooth decay, catarrhal infections, and rheumatic troubles so long as they live their own lives in the wilds. On the unfrozen Murman coast in the fishing season, when the ports and houses are crowded and dirty, respiratory and gastric complaints, tuberculosis, and rheumatic troubles are in evidence among the Lapps who come there. The Indians in British Columbia and in California, living their own lives in reservations, show no signs of chronic rheumatism, except a little osteo-arthritis of the spine in old age. Rheumatic fever with carditis is more frequent in the northern than in the southern reserves.

In temperate climates the difference in incidence of rheumatic fever between summer and winter in some cities approaches that of latitudinal difference. Thus in Cincinnati rheumatic fever is six times more frequent in March than in August and September. In Chicago the difference is much less. This difference has led many to believe that protection from sudden weather changes would go far to reduce the likelihood of rheumatic attacks, but the absence of such from Eskimo and Lapp exposed in the wilds to very severe weather conditions disproves this view. In the Tropics the open-air life is as protective as the Arctic cold.

Conclusion

The literature contains many speculations about the influence of cold and damp, cyclonic disturbances, the electrical state of the atmosphere, etc., but the evidence shows that it is conditions produced by dirty, artificially heated, and ill-ventilated houses, and density of population, which cause decay of teeth, catarrhal infections, and rheumatic troubles, the ill effect of these conditions being intensified by a diet in which the protective foods are deficient. Women suffer from rheumatic troubles more than men, because the latter by going to work change to better conditions, while at home wives give them the best

of the food. The fear of cold intensifies the ill effects of the indoor environment.

In the preparation of this paper I have been assisted by Dr. Novakovky, who has collected evidence from numerous books on Eskimos and Lapps, and from Russian and other sources.

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HEPATIC INSUFFICIENCY IN SCARLET FEVER

BY

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Nephritis is one of the most frequent and serious complications of scarlet fever. There are, in addition, cases in which, though no frank nephritis develops, symptoms and signs point to some involvement of the urinary system. At present there is no method by which the onset of this complication may be anticipated, and treatment must wait until symptoms develop, and may even then be half-hearted on account of doubt as to the diagnosis. It was therefore decided to carry out a careful clinical examination of cases of scarlet fever as a routine in the hope that some warning might be detected in the cases which later developed nephritis.

Investigation

The material was drawn from cases admitted to Belvidere Isolation Hospital in which a diagnosis of scarlet fever had been made. In each instance this diagnosis was confirmed by two medical officers. The number of cases investigated was 219. These were divided into three series.

Series 1 (63 Cases).—All were well-marked cases of scarlet fever, no mild or atypical ones being included. The investigation was carried out from the time of admission until the day on which the patient was allowed up (this was normally the twenty-first day of illness). Twelve of the sixty-three developed nephritis.

Series 2 (144 Cases).—Here all cases of scarlet fever admitted to the hospital over a period of three months were included, and the investigation was carried out for four to five days in the third week of illness. Seven in this series developed nephritis.

Series 3 (12 Cases).—These cases were all on a diet poor in protein (2.5 grammes daily) during the investigation, which was carried out for five days.

It was observed that the relation between the specific gravity and the urea concentration of a specimen of urine varied in a rather significant manner. The results have therefore been analysed from this aspect. Normally the specific gravity of urine varies with changes in the amount of urea in the urine, as a large proportion of the total dissolved solids of the urine is in the form of urea. It was considered that if some equation could be found to express this relation it might be of value in assessing the composition of the urine. The following equation has been suggested, and has been used in comparing the results of the cases:

The percentage of urea in the urine, multiplied by 10, minus the last two figures of the specific gravity estimation of the same specimen: the figure thus arrived at has been called the urea factor of a specimen of urine.

Example: If in a specimen of urine the percentage of urea is 2 and the specific gravity 1020, the urea factor is found as follows:

$$2 \times 10 - 20 = 0$$

This urea factor depends upon the proportion of the urea in the dissolved solids in the urine. This arbitrary figure was found to be normally about zero.

Results

It was observed that there was a general fall in the urea factor throughout the first three weeks of the illness, and that the figure was at its lowest at the critical period—that is, at the period when nephritis most commonly occurs, namely the end of the third week. In cases with nephritis, however, the urea factor was found to be lower than in the non-nephritic cases. This fact is best seen by an examination of the accompanying charts.

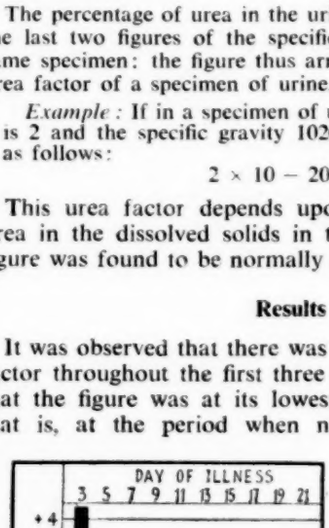

CHART I

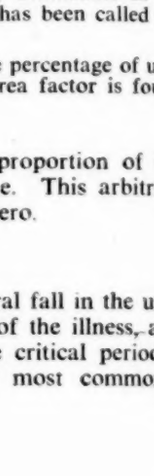

CHART II

CHART I: SERIES 1 CASES.—This shows that there is a steady fall in the urea factor until the nineteenth day, and that thereafter it rises slightly. The lowest figure is −2 on the nineteenth day.

CHART II: SERIES 2 CASES.—Here there is a fall from the seventeenth to the eighteenth day, and then the figure remains almost steady until the twenty-first day. The lowest figure reached is on the twenty-first day, and is 1.1.

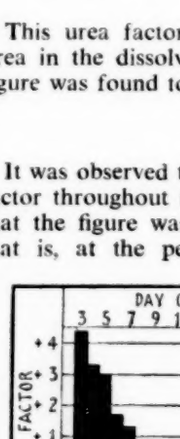

CHART III

CHART IV

CHART III: NEPHRITIC CASES.—Here the urea factor is much lower than in the previous two charts. The lowest figure reached is −5.2.

CHART IV: SERIES 3 CASES.—Here the figure is seen to remain above zero although the patients were on a low protein diet.

The first chart shows the average urea factor for each day of illness in the cases in Series 1. The second chart shows the average urea factor for each day in the cases in Series 2. The days given here are necessarily only the seventeenth to the twenty-first. The third chart shows the average urea factor in the cases which had developed nephritis. The days in this chart are taken as starting on the day of diagnosis of the nephritis. The fourth chart shows the average urea factor in the cases in Series 3 for the five days when on a low protein diet. It must be remembered that the patients in Series 1, being selected as well-marked cases of scarlet fever, were, taken as a whole, more severely ill than those in Series 2.

Discussion

An interesting point is revealed by the examination of the urea factor. It is found that the figure falls progressively throughout the illness, until on the nineteenth day it reaches the lowest point, possibly tending to rise thereafter. The urea factor depends on two tests—the determination of the specific gravity of the urine and the percentage of urea in the same specimen of urine.

The specific gravity of water is 1000, while that of urine is normally between 1012 and 1024 (Cole, 1919). The difference between the figure for water and that for urine is accounted for by the dissolved solids in the urine. The percentage of urea in the urine is the amount per 100 c.cm. of urine. The urea factor is obtained from a figure derived from the dissolved solids in the urine and that derived from the urea in the urine. It is a figure indicating the proportion of the dissolved solids in the urine in the form of urea. A low urea factor signifies that instead of the urea forming approximately 80 per cent. of the urinary solids as in the normal (Hutchison and Rainy, 1924), it comprises a much lower percentage, and the proportion of some of the other solids must be increased or some other solid introduced. That means that there is either a diminished formation of urea or a diminished excretion of urea with possibly the excretion of another solid in its place. An increase in the excretion of ammonia in the urine occurs in acidaemia. In the cases in this series there were, however, no signs or symptoms of acidaemia and no apparent reason why it should occur. It should be noted here that the twelve cases on a diet poor in protein (Series 3) all showed urea factors within the normal limits, and that not all cases on a nephritic diet gave low urea factors.

Would a damaged kidney, if unable to excrete urea, excrete another solid in its place, or would the urea which it was unable to excrete be changed and excreted in another form? It is considered that it is more probable that there is a diminished formation of urea and an increased excretion of ammonium salts to keep up the elimination of nitrogenous waste products. With regard to this diminution in the formation of urea, Cole (1919) has shown that on starvation the percentage of urea in the urine falls and that of ammonia and creatinine rises. He also stated that in hepatic disease the percentage of urea falls and the excretion of ammonia is increased. That there is some hepatic involvement in scarlet fever is known, and attention to this fact has been drawn by Rolleston (1929), who says that, although it is unusual to find any obvious signs of hepatic disturbance, a slight involvement of the liver is present in almost every case.

The urea is formed almost exclusively in the liver so far as is known at present. It is therefore quite natural to find that disturbance of liver function gives rise to diminished urea formation. In scarlet fever it is known that there is some hepatic involvement, and therefore there is possibly some diminution of urea formation. This would explain the urea factor. The urea factor is lowest in cases of nephritis, and therefore the hepatic disturbance is presumably more pronounced in these cases. Is it possible that the converse is true and that it is in the cases with the most marked hepatic involvement that nephritis develops?

If the above is a true assumption, I would suggest that this gives some explanation of the fact that nephritis is most liable to develop about the end of the third week. It is seen from the urea factor charts that the lowest point is at the end of the third week—that is, the liver function is at its lowest at this time. In some cases it is abnormally low, and in these one may expect nephritis to develop.

Summary and Conclusions

A clinical test of hepatic function is proposed, employing the specific gravity of the urine and the percentage of urinary urea. It is termed the urea factor. It is suggested that the hepatic function is low in the third week in scarlet fever and that this has a bearing on the development of nephritis. The conclusions to be drawn are:

1. The urea factor is of value in the prognosis of scarlet fever.

2. There is hepatic insufficiency in scarlet fever, and this is related to the development of nephritis.

I wish to thank Dr. T. Archibald for permission to carry out the investigation.

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Clinical Memoranda

Argyria due to Intranasal Medication

Generalized silver poisoning has become a rare condition since the internal use of silver preparations fell out of fashion. The case here reported was due to nasal medication over a long term of years, and demonstrates the danger of intranasal medication carried out without constant supervision.

CASE REPORT

The patient, an unmarried woman aged 61, was operated upon for a cleft palate at the age of 5. She has suffered all her life from migraine, and for the last twenty-five years has been taking phenacetin, 4 grains, caffeine, 1 grain. She sometimes took several powders daily, and recently has taken 100 a month. For the last ten years she has suffered from nasal catarrh associated with deafness, for which a nasal spray was prescribed shortly after the catarrh began; the spray has been used three times a day ever since. About four years ago she first noticed a greyish discoloration of the skin below the eyes, and this had gradually increased in intensity and extent. In August, 1938, after a severe bilious attack, she was advised to throw up her work as a companion and to return to Scotland.

Examination.—The patient was a small woman, thin but not emaciated, weighing 6 st. 2 lb. She was active, intelligent, and brisk in manner. Her skin was a remarkable blue-grey colour, the pigmentation being most pronounced over exposed parts, particularly on the cheeks below the eyes. The nipples and the nail-beds of the fingers were very distinctly blue. The hands and forearms showed the discoloration more than

the upper part of the arms and shoulders, and the exposed part of the neck was darker than the covered part. The ocular conjunctivae showed a faint grey-blue pigmentation, the most deeply stained region being the posterior margin of the lower lid. The tongue and buccal mucous membrane were not discoloured but were rather pale. There was a partial cleft palate, with a bifid uvula. Along the edges of the uvula was a deep blue-brown discoloration, and the nasopharynx showed the same condition in lesser degree. The heart was not enlarged and there were no murmurs; the rate was 100, with regular rhythm. The peripheral arteries were palpable but not obviously calcified. The blood pressure was 200/130. No abnormality was found in the other systems, the fundus oculi, or the urine.

The following investigations were carried out at the Royal Northern Infirmary, Inverness. Blood count: red cells, 4,300,000 per c.mm.; haemoglobin, 76 per cent.; colour index, 0.88; mean corpuscular volume, 95 cubic microns; no reticulocytosis; white cells, 8,150 per c.mm. Free acid was present in the latter half of a fractional test meal, rising to a maximum of 0.16 per cent. Spectroscopic examination of blood showed no evidence of methaemoglobinaemia or sulphaemoglobinaemia. Glucose tolerance (half-hour intervals): 119, 131, 137, 114, 95. Silver was not found in the urine. Examination of excised skin showed a few scattered granules of haemosiderin, not enough to cause pigmentation. Analysis of 102.2 mg. of dried skin gave 2.05 mg. of silver, and 625 mg. of hair gave 0.172 mg. of silver.

COMMENT

The diagnosis of this case was confused in the first instance by the belief that the preparation used was an iodized oil. The persistent abuse of phenacetin suggested the possibility that the colour was due to methaemoglobinaemia, but the absence of cyanosis in the mucous membranes and the failure to get the characteristic spectroscopic bands in the blood excluded this. Haemochromatosis was excluded as a result of the examination of the skin and by the absence of any evidence of diabetes. The discovery that the nasal preparation contained silver rapidly led to the true diagnosis. The accumulation of silver in the skin is an irreversible process, and the pigmentation, which is extremely disfiguring, is permanent. Potassium ferrocyanide has been used intradermally to produce decolorization, but the treatment is difficult to apply in a case of generalized pigmentation, because only a limited area can be treated each time and the injections are painful; the result is, of course, purely cosmetic.

Recently reported cases of silver poisoning have been almost always due to the use of silver in industry, but the increasing use of silver preparations for the treatment of nasopharyngeal complaints makes it likely that generalized argyria will be more often seen. In the present case the quantities of the preparation used were certainly excessive, but any over-eager patient might err on the side of overdosage. For this reason it would seem proper that the sale of silver preparations should be controlled, and that warning of the possible effects of overdosage should be given to purchasers. Walsh and Cannon (1938) ask the questions: "Do intranasal medicaments do any good?" and, "Can they do any harm?" This case at least provides an emphatic answer to the second question.

My grateful acknowledgments are due to Dr. Leys, Inverness, under whose care the patient was, and to Dr. H. J. Kirkpatrick, Royal Northern Infirmary, who carried out the pathological investigations.

W. F. MACDONALD, M.B., Ch.B.
Drumnadrochit, Inverness.

REFERENCE

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Reviews

OPERATIVE SURGERY

Royal Northern Operative Surgery. By the Surgical Staff of the Royal Northern Hospital. (Pp. 552; 463 figures. 42s. net.) London: H. K. Lewis and Co. 1939.

The *Royal Northern Operative Surgery* is an attractive work, since it is not only a volume of reasonable proportions but is well printed in large clear type on highly glazed paper and particularly well illustrated. It is a composite work by the eleven surgeons whose names appear on the fly-leaf, and there is everything to be said for this type of construction, for, as Sir Lancelot Barrington-Ward points out in the preface, "The scope of modern operative surgery is too vast to be compassed by any single man." Writing for his co-authors he tells us that their aim has been to produce not a textbook of anatomical exercises but a live surgery to help and refresh the practising surgeon, and we think it may fairly be claimed that the authors have achieved their aim.

Not every surgeon will agree with all the procedures described, and allowance must be made for the fact that generally speaking one method, and that the method favoured by the author, is the only one described. The statements in the section on head injuries and intracranial surgery will not be universally accepted. Few modern neurosurgeons use catgut either for the brain or for the meninges, as advocated on page 10 in the section on the surgery of intracranial tumours, and some reference to the method of performing ventriculography would have been useful here. Ventriculography may reasonably be described as a frequent part of, if not in itself, a major craniocerebral operation. Early and continued dehydration in cases of head injury with cerebral contusion has been so successful in obviating complications by allowing the injured brain to expand when healing that we regret it is not advocated wholeheartedly, and disagree with the contention that intravenous glucose is preferable to rectal magnesium sulphate because of its rapidity of action, since continued gentle dehydration appears to be what is required. We should like to have seen a reference to the use of radium in the treatment of the primary lesion in carcinoma of the lip (p. 24): few surgeons carry out wedge resection operations to-day, while many use radium. The omission is the more striking since radiotherapy is mentioned in connexion with carcinoma of the tongue. Certain chapters are of outstanding merit; as examples may be quoted Chapters XIX on the ureter and XXVI, operations on limbs. There is a useful chapter on gynaecology, but eye, ear, nose, and throat surgery is not dealt with. A chapter on blood vessels and blood transfusion adds to the value of the work; it includes the classical ligature operations which are still important.

Allusion has already been made to the excellence of the illustrations, but special reference may be made to those depicting the exposure of the temporo-mandibular joint (pp. 38–9), block dissection of the neck (pp. 70–1), and the operations on the stomach. In the section on thyroid surgery we are pleased to notice the reference to ligature operations in very severe cases of thyrotoxicosis, the degree of reaction to operation of which is doubtful; but mention might well have been made of the operation on the inferior artery, the principal artery to the gland, as well as that described, which is really mass ligature of the upper pole. These criticisms, however, merely serve to draw further attention to what is on the whole an excellent

summary of sound surgical practice. It is the best textbook of operative surgery which has appeared within recent years.

SYNOVIAL TISSUES

The Synovial Membrane and the Synovial Fluid. With Special Reference to Arthritis and Injuries of the Joints. By David H. Kling, M.D. (Pp. 299; 80 figures; 34 tables. No price given.) Los Angeles: Medical Press. 1938.

Anyone who has attempted to seek information about synovial membrane or synovial fluid knows how arduous is the search. Scores of papers dealing with one or the other have been written, but no book so far has presented even a useful summary of what is known about the lining membrane of joints and the fluid it secretes. This alone is enough to ensure a welcome for Dr. D. H. Kling's book *The Synovial Membrane and the Synovial Fluid.* He has brought together an immense amount of information collected from many workers along with his own valuable contributions to the subject, and presented it in an orderly and readable fashion. There seems little doubt that in spite of the several forms it may take the synovial membrane is a properly differentiated structure, and not merely a mesodermal surface produced in response to a particular mechanical environment; and the synovial fluid is a secretion with well-defined and fairly constant properties. This is the subject of the opening chapters, the only omission, though a startling one, being almost complete absence of reference to the prime function of the synovial fluid—namely, lubrication of the joint. Pathological conditions are next considered in great detail, and this section should be particularly welcomed by the clinician and the clinical pathologist. Therapeutic and diagnostic injections, and arthroscopy, may perhaps claim mention, but at this stage the author tends to wander from his subject, and in particular the section dealing with radiography after intra-articular injection of radio-opaque fluid is both poor and irrelevant.

Although this is essentially a book of reference, most of the chapters may profitably be read straight through, and we feel sure that Dr. Kling's work will find favour with physicians and orthopaedic surgeons, particularly those interested in the various forms of arthritis. Misprints are curiously frequent, and a few illustrations (Figs. 29, 70, 72, 73) are so indistinct as to be useless; no doubt these minor faults will be put right in a second edition.

DIABETES

Die Zuckerkrankheit: Leitfaden für Studierende und Aerzte. By Professor Ferdinand Bertram. Second edition. (Pp. 123; 17 figures; 9 tables. RM. 6; bound, RM. 7.20.) Leipzig: Georg Thieme. 1939.

After five years a second edition of Professor Bertram's practical handbook on diabetes has appeared from Leipzig. Its closely printed 120 pages cover the theoretical aspects in considerable detail and the practical treatment too, though in a way less helpful to English readers. In theory Professor Bertram is most advanced in his outlook and has accepted the latest suggestions of physiological research with such avidity that he applies it at once to human diabetes. Disturbance of anterior pituitary function is said to be the fundamental cause in many—*if not all*—cases of diabetes. Unlike most of his countrymen, he has broken away from the tradition of high-fat feeding and says that the diet must be rich in carbohydrate and low in fat. His standard diet contains 150 grammes carbohydrate and 100 grammes fat, which in English-speaking circles is neither a high-carbohydrate nor a low-fat diet. He wants his patients to live without a weighing machine or care of calories, but the diets in the book are prescribed as grammes of food and no indication of how the patient can deal with the problem in home life is given.

Professor Bertram's use of insulin differs from British practice. With old insulin three to four doses a day are given in severe cases, usually ten units only, and never more than fifteen as a routine. Protamine insulin is given sometimes once but often twice a day and no combination of old and new insulin is mentioned. In the application of theory the book is ahead of what can be done in practice; yet in many practical details it lags behind. But we think it the best book on the treatment of diabetes that has appeared in German for some years.

BONY TUMOURS OF THE NOSE

Les Tumeurs Osseuses du Nez et des Sinus. By Professor C. E. Benjamins. (Pp. 314; 103 illustrations. 60 fr.) Bordeaux: Editions Delmas. 1939.

A further addition to the series of "Monographies Oto-rhino-laryngologiques Internationales" is one by Professor C. E. Benjamins of Gröningen on bony tumours of the nose and accessory sinuses. The first part is devoted to a study of the structure of normal bone and the changes associated with osteogenesis and with absorption or destruction. Benign tumours are classified under six headings. Particular interest attaches to the fifth group, described as fibro-osteoid tumours with atypical calcification. The author has collected six examples in addition to a personal case of this tumour, which has the most extraordinary histological characters and has not yet found its way into the textbooks. In sections stained with haematoxylin and eosin a large number of particles stained deep red are seen. They appear to project above the surface of the stroma, and the appearance so produced is that of a crushed amethyst, the particles of which are scattered over the preparation. These particles are of all sorts of shapes—round, oval, square, irregular—and some of the larger ones resemble Chinese characters. The application of hydrochloric acid shows that these particles are composed of calcium carbonate. The sixth group of benign tumours comprises the various forms of osteitis fibrosa, in which the author includes four varieties: generalized osteitis fibrosa of Recklinghausen, osteitis deformans of Paget, leontiasis ossea, and localized osteitis fibrosa. A very careful study, both clinical and pathological, of the relation of these diseases to one another is made. The differences in their clinical characters are so striking that the points of resemblance are apt to be overlooked, and the author shows justification for grouping them together and for regarding them as examples of tumour formation.

The last section of the book is devoted to a relatively short but most instructive account of the malignant tumours. Although clinical descriptions of these various bony tumours are given, and where required some details of their operative treatment, the greater part of the writing is devoted to pathological and especially histological details. The book is freely illustrated with photomicrographs of sections, the descriptions of which induce a feeling of regret that they could not have been produced in colour, for the author insists repeatedly on the importance of using suitable stains and of interpreting differences in colour correctly. One of the most remarkable of these figures shows a section from a skull in the collection of Petrus Camper at Gröningen. Although more than two hundred years old it has been possible to demonstrate clearly the histological changes characteristic of

Paget's disease. The photographs of the skull show in this patient the association of leontiasis in the upper jaws with Paget's disease elsewhere.

The method of presentation results in some repetition, but the subject is so difficult and complex that this is scarcely to be avoided, and the author has succeeded in producing an orderly account of much that is usually obscure. Professor Benjamins is professor of otology and laryngology in the University of Gröningen, but he shows himself in this book not only as a clinician but as a pathologist of the first rank.

SYPHILOLOGY

Syphilis and its Accomplices in Mischief: Society, the State and the Physician. By George M. Katsainos, M.D. (Pp. 676; no price given). Athens: The Author, 23, Parnithos Street. 1939.

It is not at all clear what prompted Dr. George M. Katsainos to write *Syphilis and its Accomplices in Mischief*, or for whom he intended it. A preface of eighty-five pages is followed by an introduction of sixty-five pages before the book proper starts. Syphilis, its various stages, and its treatment are then dealt with at considerable length, but the information given is not suitable for the student anxious to acquire a knowledge of the disease and its management. Many of the statements made are extremely unorthodox, and would be unacceptable to most modern syphilologists. The *Spirochaeta pallida* is rechristened "syphilidogonus," and the author is convinced that it has more than one phase, existing at times in invisible and unrecognizable forms, that it is never completely eradicated, and, in consequence, that syphilis is never really cured. There is no doubt that Dr. Katsainos is a well-read classical scholar and has given long and careful thought to his subject, but he is too apt to draw definite conclusions from inadequate evidence. Moreover, he appears to have numerous enemies; and many countries, Governments, and individuals fall under his lash. The style of the book is florid, the English is bad, and there are many typographical errors. This book cannot be recommended to anyone but the expert, who will be interested, but probably also irritated, and almost certainly unconvinced.

A DOCTOR'S SEA NOTEBOOK

The Surgeon goes to Sea. By I. G. Briggs. (Pp. 269. 10s. 6d. net.) London: Longmans, Green and Co. 1939.

A more suitable title for this book would be "Leaves from a Doctor's Notebook." It is a delightful olla podrida of some sea-going experiences and many interesting cases that have occurred in the author's general practice, which he evidently manages on chiefly psychological lines. The sea made a pleasant break in his life; he did not take it seriously, as there was little scope for professional work in the ships in which he sailed. But he kept his eyes open and made jaunts ashore whenever he reached port. In a somewhat disappointing way, having regard to the title, when he begins to describe foreign places his pen gets side-tracked into accounts of cases ashore that have nothing to do with the story. These incidents are not all discreetly told; some of them might give non-medical readers "furiously to think." For medical men, however, the tale runs lightly and pleasantly, and the author, who has a facile style, maintains interest from beginning to end. His abrupt way of dealing with patients, especially frail sisters, will be found as amusing by his readers as it evidently was by most of those who consulted him. The most informative chapter in the book, "The Cargo of a Tramp," gives a good idea of the raw materials carried by our mercantile marine. He sums up the chapter thus:

> "Is there not enough romance in the hold of one small insignificant tramp? And the romance of the men is profounder than that of the ship or of the cargo. All have been through experiences deeper than mine. To me it has been an interlude, to them it is life, with it are bound up all their hopes and fears, all their ambitions and strivings, all their jealousies and intrigues; to me it is a passing interest, to them it is bread. I can avoid it; they must endure."

There is, however, much more than holiday interlude in the life of a ship surgeon—a branch of the profession which in these days of popular ocean travel calls for a high standard of medical and surgical capacity.

DISEASES OF THE SKIN

An Introduction to Dermatology. By Sir Norman Walker, M.D., LL.D., F.R.C.P., and G. H. Percival, M.D., Ph.D., F.R.C.P. Tenth edition. (Pp. 391; 97 figures; 102 plates, many of which are coloured. 20s. net.) Edinburgh: W. Green and Son. 1939.

This well-known textbook of dermatology has now attained its tenth edition, and like the preceding edition appears as the joint production of Sir Norman Walker, who was alone responsible for it for many years, and Dr. G. H. Percival, his successor as head of the skin department at the Royal Infirmary, Edinburgh. It still maintains the qualities that have endeared it to many generations of medical practitioners and students. Although it has naturally grown in size, it has been kept within reasonable limits by careful pruning and by the omission of anything in the nature of padding. Although severely practical, it is a work possessed of plenty of individuality, and we rather fancy that the personality of the original author is still more strongly stamped upon it than that of his modern successor. The illustrations have always been a strong feature of this textbook, and in the present edition there are no fewer than 102 coloured plates, many of them extremely good, but we feel bound to remark that some few are not so successful as they ought to be. The illustrations in the text are apposite and well chosen. We are sure that the present edition will maintain and even enhance the reputation that this textbook has long enjoyed, and we commend it cordially to the medical public.

Notes on Books

Mr. FRANK COKE'S book, *Asthma*, came out in 1923, and was fully noticed in these columns. A new edition has made its appearance (London: Simpkin Marshall; Bristol: John Wright, 15s.), and the name of Dr. Harry Coke appears on the title page with that of his father. Many changes have been made in the text, but without appreciably increasing the size of the volume. In the first edition it was stated that, although most successful in a small percentage of cases, vaccine treatment was in a large number of cases not only useless but harmful; now in the new edition emphasis is laid on the value in the infective type of asthma of vaccine therapy as applied to patients with rheumatism at the Charterhouse Clinic.

NEIL CAMPBELL'S *Qualitative Organic Chemistry* (Macmillan, 8s. 6d.) presents a scheme of examination for the recognition of organic substances by means of qualitative chemical tests. Textbooks dealing with this subject are remarkably few, and most authors content themselves with the simplest form of presentation. As the subject is one of the most difficult in the practice of organic chemistry Campbell's book is especially welcome,

for the scheme of examination is admirably planned and arranged, the most modern methods are described, and guidance is furnished for the ultimate identification of substances of a more complex character than are usually contemplated in this branch of instruction. The book is deserving of every recommendation.

Corrigendum

The book by Dr. Philip Manson-Bahr, entitled *The Dysenteric Disorders*, reviewed in our issue of July 22 (p. 171), is published by Cassell and Company and not by H. K. Lewis. We regret the error.

Preparations and Appliances

SPLIT THOMAS'S SPLINT

Mr. R. KENNON, *M.C.*, F.R.C.S., writes from the Royal Infirmary, Liverpool:

When Hugh Owen Thomas invented his splint for tuberculosis of the knee the splint ring was flat in front for the groin and well curved behind to accommodate the buttocks, thus rendering the lateral axial bars eccentric but giving the surgeon a well-fitting right or left splint as required. In the last European war a standard ring was devised to be worn equally well on either leg, but this splint was far from perfect. Pressure sores in the perineum and even over the anterior superior iliac spine were and are common, and the ill-fitting standard ring remains a danger to the patient and completely upsets the extension mechanism. Firmly convinced of the value of the Thomas's splint for fractures of the femur, I determined, seventeen years ago, to obtain for each case a selection of splints, to choose one of good fit, and so establish immediate extension from the ischial tuberosity and no other part of the pelvis—in short, to avoid pressure sores. A "nest" of split splints was made for me, and has been in use ever since. The idea is probably not original—Mr. Woolfenden certainly was considering the matter at that time. The split Thomas's splint consists of a ring and a detachable iron extension piece. It is made from an ordinary Thomas's splint by dividing the inner bar four inches below the ring and the outer bar at a corresponding level. On to the cut ends a two-and-a-half-inch piece of tubing is brazed, allowing a tube hole two inches deep. Into these tube holes the remaining length of the extension iron can be slotted when in use. A locking mechanism could be devised, but it is unnecessary.

On admitting a case of fracture of the shaft of the femur the surgeon takes along half a dozen rings and a few extension irons and proceeds to apply the ring which fits, with an iron of suitable length for the patient. Thus treatment begins at once. The scheme is adaptable to civilian and military needs. A complete "nest" for military purposes consists of rings increasing by one inch from eighteen to thirty inches, duplicating the commoner sizes (eighteen to twenty-four inches) so that altogether there are twenty rings. All the rings show clearly the size in inches. The lateral irons range from thirty-four inches, increasing by two inches, to forty-two inches, so that with four of each size again the total is twenty. This is a complete set for adults.

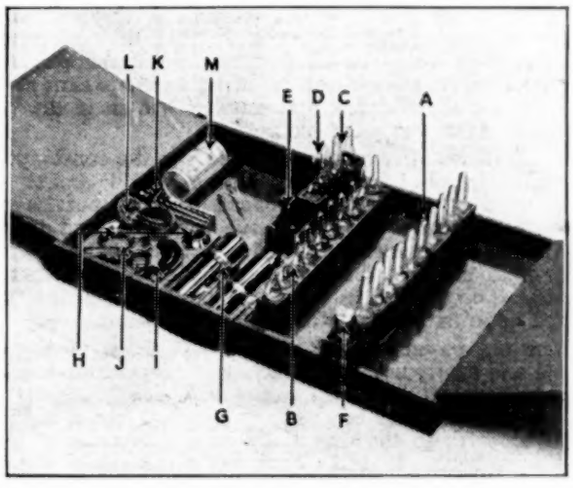
For civilian or A.R.P. work a further range must be added to cater for children. This consists of a "nest" of rings from ten inches to seventeen inches—say ten splints—duplicating the sixteen- and seventeen-inch sizes. The lateral range from eighteen inches, increasing by two inches, to thirty-six inches, giving a total of ten. The advantages of the split Thomas's splint are: (1) cleanliness and ease of replacement; (2) compactness in storage and shipping; (3) accurate fitting from the outset and no delay in manufacture; (4) absence of pressure sores; and (5) as the limb changes in size, increasing by inflammation or shrinkage due to disease, a second fitting can be done from the "nest" in a very short time.

Finally, when the patient reaches the "walking calliper" stage, again delay and misfits are avoided by selecting a suitable ring from the nest and brazing it on the lateral bars, so that a well-fitting calliper is forthcoming within a few hours, provided that someone has been thoughtful enough to prepare the boot.

PENTOTHAL SODIUM EMERGENCY CASE

Dr. RONALD JARMAN writes:

Anaesthesia in war time is still a matter of the utmost importance, and several leading anaesthetists and surgeons have expressed the opinion that the intravenous barbiturates, properly administered in small and convenient doses, would be both safe and convenient. Certainly the anaesthetist in war time must have a case which is portable, compact, complete in every detail, and containing equipment to give a number of anaesthetics and meet every possible contingency. Having in mind these basic facts, several additions and improvements have been made to the pentothal sodium emergency case which I recently described. The contents of this case are as follows: A—ten ampoules of pentothal sodium, 0.5 gramme; B—ten ampoules of chemically pure water, 10 c.cm.; C—two ampoules of pentothal sodium, 1 gramme; D—two ampoules of chemically pure water, 20 c.cm.; E—1 oz. tincture of metaphen; F—20 c.cm. picrotoxin solution; G—two 10 c.cm. Record-type syringes in spirit-proof cases, which also contain five No. 17 needles and one filling cannula; H—two gags; I—two airways; J—two tongue forceps; K—1-c.cm. Record-type syringe in spirit-proof case; L—one tourniquet; and M—one "continuous-feed" cotton-wool pack.



Space is also provided for morphine and coramine, and for files for opening ampoules. This case is 12 by 9 by 3½ inches, and weighs 6 lb. 3 oz., complete with all fittings. The ampoule holders are hinged and stand in a vertical position when the case is opened like a book. The case is made of heavy plywood with a washable cover of dark grey rexine. It has been designed to carry all the drugs and instruments necessary for the administration of a number of intravenous anaesthetics, and also supplies antidotes and materials for skin sterilization in compact and convenient containers. A card with complete instructions for use is attached, and it is believed that the anaesthetist will be quite able to administer anaesthetics safely and efficiently with this equipment. It is felt that this case, complete in every detail, will be useful in private practice as well as in war-time emergency work. The cost of the case covered with rexine is £7 10s. to £8, and the same case, covered with cow-hide and complete with all fittings, as described above, will cost £10. Since the case was designed it has been suggested that two small loops could be fitted on the front of it to take a Sparklet J carbon dioxide apparatus, as supplied by A. Charles King, Ltd., of 34, Devonshire Street, W.1. The case itself and all the contents may be obtained from Abbott Laboratories (England) Limited, Wadsworth Road, Perivale, Middlesex.

Nova et Vetera

REGIMEN FOR MYXOEDEMA IN 1884

We frequently hear of the great clinical acumen of the Victorian physicians and of their skill in treatment. We are told that, with the utmost attention to the characteristics and peculiarities of each individual patient, they detailed the dietetics and activities of every moment of the day.

Their directions avoid the unswerving sergeant-major rigidity of the modern typewritten or printed form from a diet kitchen with its barely hidden minatory injunction "You must eat it all up." Rather do they hint charmingly at a repast in almost poetic prose. A sceptical critic might possibly suggest irreverently that their directions were kept in stock for all patients as they happened to come along, were it not for the name of the patient at the head of the sheet closely and illegibly written in the very handwriting of the great man.

The absence of minute directions as to the consumption of fluid in our present-day charts would amaze the physicians of the past, as indeed it often puzzles our modern patients. We detect true reverence and respect in the detailed instructions on the consumption of port and other alcoholic beverages, while the descriptions of vintages now remind us mainly of the Christmas presents urged upon us by enthusiastic wine-merchants.

The old physician had a great advantage in that he could and nearly always did include, "Horse-back exercise should be taken daily; the canter is especially stimulating to the action of the bowels." We cannot tell a business man to drive to the City daily in a two-seater at sixty miles an hour. It might have the same effect, but the method is as indirect as that advocated by Dr. Watts in his well-known hymn, considered by Victorian parents to be admirably adapted to the children's hour on Sundays: "Blest is the man whose bowels move," the stimulus being explained in the second line, "And melt from pity for the poor." The moral contained in the last two lines may be mentioned: "He in the time of greatest need, Shall find the Lord has bowels too."

The directions given in July, 1884, by one of the most famous Victorian physicians to a patient suffering from myxoedema came into my hands some years ago. They are as follows:

"*General Directions for Mrs. A—— M——*

On rising sponge all over with warm water and soap, very quickly, and follow with a good vigorous rubbing. If this exhausts too much in the morning let it be done at night. Clothe warmly and loosely. Use suspenders for the stockings. Breakfast in bed—between 8 and 9. Crisp, dry toast and butter, or whole meal bread and butter with two eggs and some fresh fish, or bit of breast of cold chicken, or game, or fat, *not* lean of bacon, and at close of meal one large cup of tea, not hot and not infused over five minutes: coffee if preferred, or cocoa nibs made with milk, and well boiled. About eleven a coffee cup full of strong, home-made beef tea. About two, luncheon, the great meal of the day—fresh, tenderly dressed meat of any sort; bread, mashed potatoes, fresh softly boiled green vegetables and some simple farinaceous pudding or cooked fruit. Drink three ounces of stout, Burgundy, or of St. Raphael wine or of light dry old port. If the wine disagrees try two desert spoonfuls of any good spirit in two thirds of a tumbler full of water. If all alcoholic drinks disagree take water only. But persevere with wine if possible. Afternoon about five, crisp dry toast and butter, with a cup of café au lait, or of cocoa-nibs. Dinner about eight. A meal like lunch, except that white meats may take the place of red Beverage also the same. Nothing after this meal. Nothing between meals and nothing but what is here set down. Recline one hour every afternoon. Be as much as possible in the sun and air and twice a day according to the measure of the strength take a pottering walk. When in the country drive a low pony chaise and from time to time get out and walk. Solicit the action of the bowels daily and avoid as much as possible aperient medicine. If help is needed take before dinner just as much of a compound rhubarb pill as will persuade nature to act once after her usual manner.

Medicines: If you get feverish at any time, or chilled or are threatened with a cold get at once into bed and take, every two hours until the chill and fever are over, a teaspoonful of the Solution of Citrate of Ammonia, and an eggspoonful of sweet spirits of Nitre in a wine glassful of water.

(Signed) A—— C——."

H. L. TIDY.

A GRADUATE COURSE IN MEDICAL HISTORY

So popular was the first graduate week in medical history held at the Johns Hopkins University Institute of the History of Medicine at Baltimore in April, 1938 (see *Journal*, 1938, **1**, 1163), that a similar course was organized this year during the week of April 24 to 29. Attended by thirty-nine men and women interested in the history and literature of their profession, the programme was devoted to the subject of medicine in the Renaissance. The mornings were taken up by lectures delivered by Dr. Henry E. Sigerist, director of the Institute and professor of the history of medicine in the University, and by the members of his staff, Drs. Owsei Temkin, Ludwig Edelstein, and Sanford V. Larkey. Among the topics discussed were: economic, social, and political foundations of the Renaissance; science and technology during that period; the physician in the Renaissance; and hygiene and public health. Each lecture was illustrated by a critically selected exhibition of the most authoritative literature pertaining to its subject-matter. The afternoons consisted of informal seminars in which the following subjects were discussed: the concept of the Renaissance; bibliographical and biological problems; diseases prevailing in the Renaissance and their interpretation; and medical literature in the vernacular. As in the first graduate week, much imagination had been lavished on the preparation of the programme. Sufficient leisure enabled the individual members to make or renew acquaintances and to consult Dr. Sigerist and his associates on various problems of research. A play, "The Black Dart of Death," had been adapted for the stage by Dr. Larkey from William Bullein's "A Dialogue against the Fever Pestilence," 1564, with much of the allegory, symbolism, and descriptive material skilfully omitted. At the banquet concluding the course Dr. John Rathbone Oliver gave an address on "The Oxford of Anthony Wood," and presentations were made to Dr. Sigerist and to his secretarial staff. Since medical history is so often regarded, in this country at least, as a hobby to which a man may turn in the evening of his life, it is significant to note the number of comparatively young people—and busy practitioners at that—who attended this graduate course at Baltimore.

W. R. B.

The Bureau of Social Hygiene of the New York City Department of Health, in co-operation with the Section on Dermatology and Syphilology and the librarian of the New York Academy of Medicine, has displayed in the Academy Library a historical exhibit, "Contributors to the Knowledge of Congenital Syphilis." With the aid of books, pamphlets, and portraits, the work of such men as Rondelet, Fernel, Fallopio, Montanus, Fournier, Parrot, Profeta, Colles, and Hutchinson is strikingly recalled.

A correspondent has brought to light that in 1839 the number of medical students in the French medical faculties was as follows: Paris 3,500, Montpellier 550, and Strasbourg 160, making a total of 4,210.

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THE ABERDEEN MEETING

Optimist and pessimist have one thing in common —they both believe what they want to believe. The latter plays for a kind of desperate safety, and for the former the dawn is always rosy-fingered. The dawn of the Aberdeen Meeting was not heralded in such poetically Homeric fashion. The pessimist was in his element because he could hold his victim by the sleeve and whisper in his ear that the last Annual Meeting of the British Medical Association at Aberdeen was in 1914. This year the omens were just as bad. But the optimists who went to Aberdeen in the full expectation of getting their money's worth were justified in the event. History lived up to its reputation of never telling the same story twice, and not so much as a crisis came to disturb the calm thoughts of those whose deliberations in the fields of both medical science and medical politics continue to shape the course of medical history. In many ways the Aberdeen Meeting was a model of how the yearly conference of the Association should be conducted. During the past few years friendly critics have suggested, not without reason, that there has been too strong a tincture of gaiety in the annual prescription of wit, wisdom, and wiliness. We have suggested before in these columns that an infusion of austerity might be added to the delectable mixture to which we have become accustomed, that too much junketing puts too great a strain on host and guest. Aberdeen is built on rock. It is an ancient university city. Here learning has its throne and is reverenced. Trivial and ephemeral matters are treated for what they are worth and no more. And the steady, cautious, sober spirit of the place informed the counsels of the representatives and of those who attended the Scientific Sections, although the cares of the Medical State seemed at times to sit too heavily on the shoulders of the former and caution urged them to courses whose safety might yet prove to be precarious. To one resolution at least of the A.R.M. the public may reply with the motto of Marischal College: "Thay haif said; quhat say thay; lat thame say."

We are enjoined by purists always to seek the right "referents" and to avoid the deadly sin of animism. To talk about the "spirit of Aberdeen" is a harmless lapse into primitive thinking and a less prosaic way of saying "the behaviour of Aberdonians." This behaviour is the distilled product of hard work, clear thought, a kindly courteous attitude to strangers, and a Spartan quality of character. It was these attributes that gave the Aberdeen Meeting its own special flavour, and it was these attributes that the President, Dr. Thomas Fraser, brought to bear upon the work in hand. To him the British Medical Association is much indebted for one of its most successful meetings of recent years, and here we may pay a special tribute to one who bears much of the burden of the day, unsung if not unhonoured—the President's wife. The President was, of course, aided by an army of willing workers, and it is no secret that the successful organization of the meeting depends largely on the efficiency of the Honorary Local General Secretary. The meeting this year was exceptionally well run, and with an entire absence of fuss, and much of the credit for this is due to Mr. E. G. Collins, who held the office.

The Representative Meeting was the largest on record, 296 putting in an attendance, among them ninety-four for the first time. This record may have resulted in part from the desire of many exiles in England to return even for a brief period to their native land, but it probably also reflects the growing concern of the medical profession with medical politics. Change is in the air, and more men are becoming anxious to decide what direction the change shall take. When Dr. E. R. C. Walker asked the Council to consider amendments to the General Medical Service for the Nation the Representative Body supported him by a majority vote, although similar amendments put forward at a previous meeting had been rejected, as that astute statesman Sir Henry Brackenbury pointed out, only by a minority of two. The conversion of so small a minority into a substantial majority shows at least a desire for further discussion. But the size of the majority might have been in part due to a tendency throughout the meeting to challenge the edicts of the platform. This was shown at the beginning of the business of the first day, when the Chairman of Council moved as a Council recommendation that the B.M.A. should discontinue its membership of the A.P.I.M. The occasion lent itself to eloquence, and eloquence there was, against which the persuasive voice and marshalled argument of Sir Kaye Le Fleming were unavailing. This initial success of the Representative Body gave it an appetite for more, and on at least one occasion it showed itself more conservative than the Council—when it rejected the recommendation that a State-certified midwife may, under certain provisos, administer nitrous oxide and air by an approved apparatus

as an anaesthetic in labour. The Representative Body may, to repeat the "Celtic Bull" of one of its members, have "glued a blind eye to the telephone," or it may have been aware of the implications of the following remark made by Mr. L. Carnac Rivett in a letter to the *Times* of July 29: "The well-to-do naturally prefer a qualified anaesthetist, but the poor cannot afford to pay for the services of such an expert for the four or five hours of the worst pains of labour." At all events, the discussion completed, many representatives felt they had done a good day's work, and left the Hall. Shortly after this the Chairman, realizing there was not a quorum, sent emissaries into the highways and by-ways before taking a roll-call, acting under the Standing Order which begins: "No Representative shall leave the Meeting without permission obtained personally from the Chairman." Rebuked, but by no means disheartened, the Representative Body rejected the recommendation of the Mental Health Committee that recognition should be extended to lay psychotherapists. It may be that the meeting felt a little uneasy at the suggestion that while the midwife could administer gas-and-air to a pregnant woman the general practitioner himself was not competent to refer patients for treatment to a lay psychotherapist. The frequent reference throughout the meeting to "another nail in the coffin of the G.P." showed clearly the sense of apprehension abroad.

The Scientific Sections this year came into their own again, in spite of the fact that the meeting was a smaller one than usual. Over 450 people attended the joint discussion of five Sections on chemotherapy in the MacRobert Hall, and the opening speakers rose to the occasion. Their papers are published in this week's *Journal*. A large audience attended the second session of the Section of Medicine to hear Professor Einar Meulengracht on the treatment of peptic ulcer, and few who were there will forget his photographs of the patient treated under the old regime and that of the patient treated on the lines laid down by Professor Meulengracht himself. Of equal interest was the third session, when Sir John Ledingham opened a discussion on prophylactic immunization against certain infectious fevers. There is not the space to refer to all of interest in the Section meetings, for there was so much that was good, but we may mention the stimulating joint discussion between the Sections of Diseases of Children and of Medical Sociology, when Sir John Orr talked on problems of nutrition of the mother and the child. Nor must we forget Dr. Andrew Topping's quixotic tilting at the old-fashioned windmill—Harley Street. Don Quixote, if we remember rightly, became unhorsed.

We can but end by thanking Aberdeen medical men for their good fare and their goodly company. We know the great part they have played in the past in keeping medicine from stagnation. But Aberdeen knows the art of using tradition and is aware of the dangers of falling a victim to its antique graces. The medical students of the future will have the benefit of the combined influence of the old and the new in the magnificent buildings and modern equipment of the medical centre at Foresterhill, opened by Lord Dawson of Penn towards the end of last year. May the union of old tradition and modern equipment prove as fruitful as the union of King's College and Marischal College to form one university.

SCIENCE AND SOCIETY

It seems that everything is wrong with science just now. Not long ago a number of more or less eminent persons engaged in scientific work of various kinds combined to demonstrate its "frustration." More recently another scientist has been at some pains to remind us that he and his fellow-workers are "human," with the corollary that their conclusions are therefore untrustworthy and their motives necessarily suspect. Now comes Professor Bernal to repeat or reinforce these presentations in a portentous volume of just upon five hundred pages, with four hundred and fifty (and in not a few cases nine hundred) words to a page. It is entitled *The Social Function of Science*,[1] a subject worthy of serious, careful, and unbiased consideration. If length and earnestness are to be accepted as criteria of seriousness, then Professor Bernal's book passes this test. If abundance of quotation and reference, skilfully chosen to support a particular thesis, is the mark of care, then this test, too, is passed. But instead of a quite impartial inquiry into what exactly are the social functions of science, how far they are succeeding or failing of fulfilment, and in what ways they could be more effectively exercised, the author starts out with the enunciation of the propositions that science, in spite of some results that have been beneficial, is both harmful and unpopular, that its current social function is to serve industry by reducing costs, speeding up workers, and reducing wages, that it is only its contribution to profits that gives it its present importance, and that if it were not for this "science would sink at once to a level at least as low as that which it occupied in the Middle Ages." To the support of these remarkable propositions the rest of the volume is devoted, until the final conclusion is reached that it is only

[1] *The Social Function of Science*. By J. D. Bernal, F.R.S. London: Methuen and Co. (7s. 6d.)

by the establishment of a communist form of society based upon Marxian principles that science will be able to perform its social functions. This conclusion does not seem to follow as a logical necessity even from the one-sided choice and presentation of facts and opinion offered by the author, though it has a curious similarity to the equally unproven implication, which we combated in reviewing the volume previously referred to, that the "frustration of science" was due to one main cause described as "capitalism," "the present economic system," or "the existing social organization."[2]

It should require less than a quarter of a million words to demonstrate that this conclusion is unsound and to show the strange and biased nature of the statements or contentions which purport to establish it. One or two examples will suffice. The double-barrelled charge against science is odd: that it is both unpopular and harmful. If the latter be true the former should surely be a matter for rejoicing rather than regret. But what is the criterion of popularity adopted by the author? It is that instead of being interested in football pools people should be "backing Professor B's theory against Professor A's at ten to one." To this the author adds a note asserting, by way of contrast, "the immense popularity of all forms of science in the Soviet Union, as shown in the Press, in the clubs, and in the parks of culture and rest." Again, the author quotes extensively, with approval and in support of his main thesis, from the broadcast and article put forth by Professor Mottram a few years ago, containing aspersions on the education, skill, knowledge, and honesty of medical practitioners, which were shown in these columns and elsewhere to be unwarranted[3]; and he declines to except medicine from his indictment inasmuch as "the great developments of modern health services may be seen as a necessary factor for the preservation of a vast and congested industrial population."

That science is by its very nature incomplete and imperfect may be readily admitted. The open mind, preparedness at any moment to admit additional authenticated facts and to modify conclusions and theories in accordance therewith, and a restrained creative imagination in forming new ones, are virtues of science, not vices. What is unsatisfactory in the position of modern science is not due to this, but may be put more soberly in a series of propositions which will probably meet with general acceptance. Education in many schools and colleges may be too predominantly and at too early an age based upon science rather than upon what are called the "humanities"; and the teaching of science may itself be directed to technical details, exact measurements, and mathematical calculations rather than to principles and methods. Scientists themselves may often be almost wholly engrossed in their own subject or narrow field to the exclusion of a wider interest and culture. Advances in physics and chemistry, and the consequent preponderance of these particular branches of science in teaching and in practical application, have outrun the sciences of life and mind which are of still greater importance to human well-being. The social sciences are even less developed and applied. Many inventions arising out of scientific discoveries have been put to unworthy or destructive uses. But ought this to be charged against science or against scientists? Is it the fault of science that a wrong use has been made of some of the gifts which it has showered on humanity? Even on balance of benefits as against misuse it cannot be doubted that human comfort, happiness, welfare, and scope have been immensely increased by the advance of science; and in the medical field at least the gains are almost entirely without counterpoise. The whole situation points to the need not for less science but for more. Biology, psychology, and sociology are rapidly coming to the rescue so far as rescue is needed; though there is no indication that they must lead to that communist reconstruction of society which Professor Bernal thinks desirable and essential. It may be, nevertheless, that in the rising generation they will modify the present tendency of scientists and engineers—who must be classed with scientists in this connexion—to fashion powerful machines or perfect important processes, and then to disclaim all responsibility for the use that is made of them.

[2] *British Medical Journal*, 1935, **1**, 1125.
[3] Ibid., 1934, **2**, 475.

TWO B.M.A. OFFICERS

Last week two leaders of the British Medical Association relinquished high offices which they had held with outstanding success and distinction. Happily for us all, they remain members of the Council, and we count on their active interest in the central work of the Association for years to come. It was known that Sir Kaye Le Fleming would not seek re-election as Chairman of Council at the Aberdeen Meeting. Nature had destined him for leadership and the conduct of public business; but there must be a limit to the claims his profession can make upon a man in practice, and Sir Kaye, while practising in Dorset, has held three major chairmanships in succession—of the Panel Conference for five years, of the Representative Body for three years, and now of the Council for five fruitful years. The name of Le Fleming stands high on the roll of medical statesmen: his gifts of mind and character and speech have been applied

without stint to the advancement of the profession and the public good. Mr. N. Bishop Harman has been Treasurer of the Association for fifteen years—a far longer period than any previous holder of that office. He became a member of the Council in 1915, and had represented the Marylebone Division at the first meeting of the Representative Body in 1903. A bare enumeration of the many posts he has held and the tasks he has carried through would fail to give an idea of the man himself and what he has meant to the Association through all those years of devoted enthusiastic service. No more versatile mind than that of Bishop Harman has worked for medicine and the common health, and the duties of Treasurer, arduous and responsible as they are, have never set bounds to his energy, public spirit, and good nature.

THE MUSEUM AT ABERDEEN

The museum this year included a pathological section, a historical section, a radiological section, and "special demonstrations." The Museum Committee is to be congratulated on assembling such an interesting and instructive collection. The pathological section, arranged in the Geological Department at Marischal College, included, as the main part of the exhibit, 135 preserved specimens. These were systematically arranged and constituted a group representative of many phases of human morbid anatomy. Each specimen was accompanied by a concise synopsis of the clinical and pathological observations supplemented by photo-macrographs and micrographs. Of local as well as general interest were the liver and kidney of a patient who had died from Weil's disease, a condition that appears to be remarkably prevalent among the fishworkers of Aberdeen. We would also draw attention to such rarities as actinomycotic basal meningitis complicating osteomyelitis of the sphenoid bone and an actinomycotic abscess of the right parotid gland, a solitary plasmocytoma of the occipital bone in an elderly female, and a mixed tumour (? ganglioneuroma) of the spermatic cord. Of note, too, was the demonstration of colour photographs illustrating a variety of skin diseases, arranged by Professor D. F. Cappell of Dundee. Drs. J. T. Irving, J. Duckworth, and M. B. Richards of the Rowett Research Institute, in an exhibit of the influence of diet on tooth formation, demonstrated (1) abnormal stratification in the dentin on a diet deficient in magnesium, (2) stratification in the dentin and "interglobular spaces" when the calcium and phosphorus contents of the diet are inadequate, and (3) a complex disorganization of structure in vitamin A deficiency. Drs. Irving and Richards also demonstrated degeneration of the funiculus praedorsalis (an efferent tract corresponding to the tectospinal tract in man) in rats fed with a diet lacking in vitamin A at the time of weaning. The change was associated clinically with a certain amount of spasticity, especially of the hind limbs. Dr. A. C. Lendrum of Glasgow exhibited microscopical preparations of glomangiomata to illustrate the paper on this subject read before the Section of Pathology and Bacteriology. As was to be expected in Scotland, the historical section was full of interesting items. Among them was a copy of the Bull of Pope Alexander VI, dated February 10, 1494, authorizing the establishment of the University in Old Aberdeen. Medicine was included among the faculties to be taught, and it appears, therefore, that Aberdeen was the first British university to have a medical school: professorships of medicine at Cambridge and Oxford were founded in 1540 and 1546 respectively. A portrait of Sir Alexander Ogston, who was regius professor of surgery at Aberdeen from 1882 to 1909, was accompanied by his demonstration cultures of the *Staphylococcus pyogenes aureus*. There was also a photograph of Ogston operating with a carbolic acid spray in use. Among other exhibits we may note a collection of Manson relics selected by Dr. P. Manson-Bahr from the collections of the Royal Society of Tropical Medicine and Hygiene and the London School of Hygiene and Tropical Medicine. Manson was apprenticed in the foundry of Blaikie Bros. in Aberdeen before beginning his medical studies at the age of 16. An exhibit of the angler fish (*Lophius piscatorius*) shows how near the present President of the B.M.A. came to discovering insulin. With Dr. J. Rennie he published in 1907 the results of injecting islet tissue from the angler fish into a patient suffering from diabetes. The cataloguer of the Museum goes on to state: "The severe reaction led the experimenters to drop hypodermic injections immediately, but the late Professor J. J. R. MacLeod, himself a graduate of Aberdeen University, and director of the team of investigators—MacLeod, Banting, Best, and Collip—which finally succeeded in isolating insulin, declared that Fraser and Rennie were really the first workers ever to isolate insulin, and that had more been known then about the preparation of protein-free extracts the medical profession would not have had to wait another fifteen years before this powerful therapeutic weapon was placed in their hands."

MOSQUITO-SCREENING IN WEST AFRICA

In 1935 Blacklock[1] published an interesting paper on the screening of houses in the Tropics, and concluded that wire screencloth made of wire of No. 30 imperial standard wire gauge and having fourteen meshes to the linear inch was entirely adequate. The suspicion that such screening might allow mosquitos to pass prompted Davey and Gordon[2] to reinvestigate the matter. During the work interesting observations were made on the mechanism of penetration. The mosquito first probes the aperture with its proboscis and head, later pressing the forepart of the thorax through the opening. It then withdraws, inserts the forelegs, reintroduces the head and thorax, and rotates the thorax so that its maximum diameter lies in the diagonal of the aperture. It then wriggles through assisted by traction of the forelegs, the remaining legs being closely pressed to the abdomen, and finally falls, sometimes

[1] *Ann. trop. Med. and Parasitol.*, 1935, **29**, 261.
[2] Ibid., 1938, **32**, 413.

dropping several inches before expanding its wings. Some 16,000 mosquitos were tested against screens having apertures of from 0.043 to 0.059 of an inch, the mosquitos chiefly used being *A. funestus* and *A. gambiae*. As *A. funestus* is probably the smallest anopheline in West Africa transmitting malaria and filariasis the test was severe, but not unreasonably so, since a survey in Sierra Leone revealed very high infection rates among these mosquitos. Thus, of *A. gambiae*, 16.3 per cent. were found infected with malaria and 14.6 per cent. with *Microfilaria bancrofti*, while the corresponding figures for *A. funestus* were 7 per cent. and 8 per cent. respectively. The results of these experiments showed that the maximum aperture safe against anophelines in West Africa must not exceed 0.047 of an inch, which is represented by standard screencloth of mesh 16 by 16 made of wire of 28 s.w.g.

BROWN v. WHITE BREAD

It might be thought that the battle between brown and white bread has been fought too often and that the recurring victories of the former would justify the cancellation of what has now become an annual fixture. It is true that the idea has triumphed, but anything that brings grist to the mill of those who want to translate the idea into action is to be welcomed, and such is the comprehensive review of the nutritive value of wheaten flour and bread recently made by A. M. Copping.[1] White flour is made by grinding the endosperm of the wheat berry to a fine powder, the outer layers being removed. The usual extraction of the finer parts amounts to 70 to 72 per cent. of the whole; this type of flour is termed "straight-run" or "standard-grade" flour. It is the one in most general use in this country. Finer flours still can be obtained by further milling; "long patent" and "top patent" flours are the products of 60 and 42 per cent. extraction respectively. In patent flours the fat content is about one-half and the ash content about one-sixth of that found in whole wheat. Bleaching does not greatly alter the general composition of flour. There are various ways of measuring the biological values of proteins: one is by determining the ratio of body nitrogen spared to food nitrogen absorbed; another is by measuring the percentage of the protein required in the diet for maintaining body weight and normal growth; and still another is by measuring the increase in weight corresponding to the amount of protein ingested. Various workers using these methods have shown that in the modern process of milling the biological value of wheat protein is lowered for nitrogen repair as well as for growth of the animal organism. The evidence for the relative availability and digestibility of the carbohydrate of whole wheat and white flour is somewhat conflicting. The reduction of the iron content of the whole berry to one-fifth of its amount in patent flour is probably very serious. The vitamin C and D content of wheat and wheat flour is *nil*. The amount of carotene in whole flour is enough to be of value, but it is largely lost during milling, and the small amount that survives in flour after milling is destroyed during the bleaching process. The vitamin B (complex) content of the wheat seed is considerable. It has been thought for a long time that the whole of the vitamin B complex of the wheat berry was contained in the embryo and outer layers, and that the endosperm and therefore the white flour made from it were devoid of these factors. It has been recently shown, however, by Copping and Roscoe[2] that whole wheat may contain from 1.2 to 3.4 (mean 1.86) international units of vitamin B_1 per gramme, that stone-ground flour may contain 1.6 units, and that the amounts in white flour decrease rapidly with increase of milling—for example, 1.2 units in 95 per cent. extraction, 1.0 in 82, 0.4 in 75, 0.37 in 70, 0.24 in 60, to 0.00 in 42 per cent. They found whole-wheat bread to contain 0.95 (0.75–1.3), "brown" bread 0.6 (0.5–0.8), and white bread 0.22 (0.12–0.30) units per gramme. The flavin content of white flour is about a half of that of whole-meal flour and is partly destroyed during storage. Whole-wheat flour contains vitamin E, but white flour almost certainly contains none. Thus the more exact information on the nutritive value of whole-wheat and white flours made available by more accurate methods of determination fully confirms the earlier impression of the really serious inferiority of white bread as compared with wholemeal bread in every criterion of nutritive value so far adopted.

[1] *Nutr. Abstr. Rev.*, 1938, **8**, 555.

ABSORBABLE INTERNAL SPLINTS

Internal splints, by which we mean supporting materials in actual contact with the fragments of a broken bone, have been made of various materials and their popularity with surgeons has undergone varying phases. At times they have been widely employed, as when Arbuthnot Lane popularized the use of metallic plates fastened by screws, while the mention of silver or bronze wire or of Parham's bands will recall other forms of internal splinting with metals. Beef-bone bobbins, cowhorn, the eye-tooth of a walrus, the antler of a stag, and other substances have also been tried. To-day, however, it is generally felt that the operative treatment of fractures is rarely called for, and that when it is necessary any internal splint should be of bone derived from the patient. "Ironmongery" has gone out of fashion—except in the case of subcapital fractures of the femoral neck. Apart from the fact that the employment of metals means the conversion of a closed or simple fracture into an open one, the chief objection to the use of steel plates or silver wires is the reaction set up in the bone. Decalcification and delayed union have been observed, and, in addition, because of their working loose or for other reasons, it is often necessary to operate a second time and remove these metal splints. This last objection at least seems now to have been overcome.[3] A magnesium alloy may be used for internal splinting, and it is claimed that this is sufficiently rigid and strong for the internal retention

[2] *Biochem. J.*, 1937, **31**, 1879.
[3] *J. Amer. med. Ass.*, 1938, **111**, 2464.

of bone fragments and is also totally absorbable. Thus a screw of this alloy weighing 1 gramme was completely absorbed from the humerus in 120 days. E. McBride of Oklahoma advocates an alloy of magnesium, aluminium, and manganese and has employed it on a number of occasions with what he regards as encouraging results. During absorption hydrogen and nitrogen are formed in the tissues and are demonstrable radiographically, but it is said that the gas is absorbed and is "no more harmful than so much air." These absorbable metal splints are apparently a distinct advance on the steel plates, but it is still doubtful whether "ironmongery," however refined, is surgically sound. It is amazing how well tissues, and particularly bone, tolerate foreign bodies, but when internal splinting is desired, physiologically the soundest material to use is bone itself from the patient himself.

CHECKING PRODUCTION OF OPIUM

A further stage has been reached in the rather deliberate progress towards limitation of the production of raw opium which the Council and Assembly of the League of Nations some years ago directed the advisory committee to undertake. A report on the preparatory work accomplished by the committee has recently been presented to the Council, together with a draft of the principal articles for a convention "to limit and control the cultivation of the opium poppy and the production of raw opium and controlling other raw materials used in the manufacture of opium alkaloids." The articles—thirty-four in number—are grouped in twelve chapters dealing with the purposes for which raw opium may be produced, estimates and allocation of production, internal and international control, the regulation of stocks and prices, etc. The purposes for which the production of raw opium shall be limited are: (1) medical and scientific purposes, including the manufacture of drugs for medical and scientific purposes; (2) manufacture of prepared opium or sale for use in the form of prepared opium; and (3) other non-medical consumption where such consumption is lawful. The last two objects will doubtless again be the subject of discussion, as was the case in the Geneva Conferences of 1924–5. Attention will be called to the fact that the Hague Opium Convention of 1912, twenty-seven years ago, contemplated the gradual and effective suppression of the manufacture of, internal trade in, and use of, prepared opium. The third specified object—"other non-medical consumption"—is presumably inserted to meet the case of opium-eating as recognized and officially approved in respect of India. It will doubtless be opposed by those who maintain that the medical use is the only legitimate use of opium as contended by the American delegation. The Council of the League has approved the transmission of the draft articles to Governments for their observations with the request that these should reach the secretariat not later than March 1, 1940. They are also to be scrutinized by "a committee of jurists in order to be put into proper legal form," and fifteen nations specified are to be invited to appoint jurists to serve on the advisory committee, which will meet at the beginning of April, 1940.

THE STUDENT AND THE PATIENT

The statement that "the patient is more important than the disease," or that it is the proper business of the doctor to treat the patient rather than the disease, is occasionally disputed or questioned, but never by an experienced general practitioner. A specialist or consultant called in on a single occasion or for the purpose of helping on a particular point or of carrying out some determined method of treatment in which particular manipulative skill is required may properly take a different view of the matter or of his function in the special circumstances; but for the great bulk of the profession in their daily work the statements mentioned are profoundly true. This being so, question may well be made as to the best method of approach in giving to students a systematic course of lectures on medicine. The textbooks present them with a seriatim account of the diseases of the various organs and systems, and clinical lectures and demonstrations make these accounts more vivid and enable further questions to be raised. Any systematic course of lectures should surely, therefore, not be arranged on lines similar to those of the student's textbook reading. There may be great value, however, in introducing him to the patient as an entity by means of such a course, which for this purpose need not be a long one. In such a course the student's attitude to his future work may be profoundly influenced and his entry upon independent practice greatly facilitated. He will learn to appreciate more than he often does at present the fundamental nature of disease, the fact that it manifests itself very differently in varying types of patients, that he is required to be something more than a mere scientific observer, and that the psychological aspects of illness are not less important than the physical aspects in a large proportion of the cases with which he will have to deal. An example of a course of instruction after this fashion is to be found in *The Patient is the Unit of Practice*, by Dr. Duane W. Propst, assistant professor of medicine in the University of Illinois.[1] Its three parts deal broadly with aetiology, diagnosis, and treatment in the manner indicated, and prominence is given to a saying of Sydenham, "Most importance is to be attached to the desires and feelings of the patient, provided they are not excessive or dangerous, than to doubtful and fallacious rules of medical art." Though the author may perhaps be too rigid in his description of types of mind and body, and though the reader who does not like split infinitives will have many a shudder, it is a good and wise book and should be helpful both to the student as it stands and to teachers who may amplify, modify, and improve in their own courses of lectures the aspects of medicine and lines of thought which it exemplifies.

[1] London: Baillière, Tindall and Cox. Springfield, Illinois: Charles C. Thomas. 16s. and 8 dollars.

WAR WOUNDS AND AIR RAID CASUALTIES

The following is one of a series of lectures on the Treatment of War Wounds and Air Raid Casualties recently delivered at the British Postgraduate Medical School

WAR INJURIES TO THE GENITO-URINARY TRACT

BY

G. E. NELIGAN, *M.C.*, F.R.C.S.

Looking back on the experience of the last war, during which I was for two and a half years in a clearing station performing abdominal surgery, the thing that strikes me was the comparative rarity of wounds of the kidney or the urinary tract. When we consider the hundreds of abdominal cases on which we had to operate, the infrequency of kidney wounds appears remarkable. The reason for it I do not know, except that injury of the kidneys, relatively small organs, might be missed among the more extensive and obvious abdominal injuries which reached the clearing station. The injuries were those caused by machine-gun bullets, shrapnel bullets, and high-explosive shells. In the next war, regarding the matter from the point of view of civilian injuries, the damage caused by the high-explosive bomb and the crushing injuries due to falling masonry will also have to be considered.

One thing which we discovered in the last war was, in general, the uselessness of operating on patients immediately they were brought into the station. Many men shot in the abdomen were received in a terribly collapsed condition, and at first were operated on immediately, and of course they died. The better way was to take some measures of resuscitation, warming them, and relieving their pain, and then, when they reached the optimum period of improvement, to carry out the operation. The habit of detecting such a period was acquired, for it was usually found to be a couple of hours after the case was brought in. If one waited longer than this the patient began to go downhill again.

Injuries to the Kidney

We may take first the case of the man who has been hit by a missile from a machine-gun. There may be a small entrance wound in the loin, and an exit, indicating the line the bullet has taken in passing through the kidney region. All that the patient complains of may be some haematuria, and no sign of any intra-abdominal injury may be found. Such a patient will be left alone, but watched carefully for any further development. On the other hand, if there is a wound, from a bullet, high explosive, or shrapnel ball, with an entrance but no exit, and the patient's symptoms are still entirely local, with haematuria, the treatment is excision of the wound. High-explosive shells in particular produce rather jagged foul wounds. If, in excising, we come across the piece of shell or shrapnel lodged in the kidney, there is no need to do anything further beyond removing it, cleaning out the tract, and draining, after which we wait to see what happens.

In the case of an exit wound through the loin with any of these forms of missile, we may know that the intra-abdominal damage is limited to the particular sector of the abdomen, and in that case the wound will be excised and the kidney explored from the loin. The ordinary loin incision will enable us to ascertain what the kidney looks like, and the incision can be continued forward and the peritoneum opened, so that the colon, spleen, or other organ which may have been damaged may be reached. There is no need in these cases for a large laparotomy, because the actual limits of the passage of the piece of shell are known.

If there is a wound in the loin with an exit somewhere else in the abdomen, or no exit at all, and the patient is suffering from haematuria, signs of intra-abdominal haemorrhage, abdominal pain, and rigidity, the surgeon must open the abdomen extensively in order to have plenty of room to carry out his exploration. In the kidney itself the damage may be slight—just a local haematoma, which may be left alone while the other trouble inside the abdomen is dealt with. I emphasize particularly the need for a large incision, especially if the place of exit is not known, so that it may be possible to explore the whole abdomen from the stomach down to the rectum.

Sometimes it is found that no injury has been done to the intestines themselves, although the patient when examined showed all the signs of an intraperitoneal injury. There may be extensive retroperitoneal haemorrhage. These patients always suffer a great deal of shock, pain, and distension. In such cases the kidney is dealt with in the best way possible, with drainage lest there be an infection of the retroperitoneal tissues. If the kidney itself is badly damaged, with extensive haemorrhage around it, it will be necessary to carry out a nephrectomy. No time is available in these cases to risk doing what may be called "fancy operations." With these abdominal wounds the chief factor is speed, partly from the patient's point of view and partly because of the pressure under which the work has usually to be done.

In the majority of cases, therefore, where the kidney is severely damaged a nephrectomy has to be performed. Occasionally the surgeon may have the fortune to come across a case in which the damage was done only to the periphery of the kidney, in which event he is justified in suturing, and may hope to save it. Injuries to the pelvis of the kidney are treated as in civil life. If it is possible the pelvis is sutured, but if it is completely torn away, then again a nephrectomy is necessary.

Wounds of the Ureter

Wounds of the ureter were also very seldom seen in the rush of war injuries. We may, of course, come across them afterwards on opening up the abdomen, though they had never been diagnosed at the time. In opening an abdomen full of blood and faeces it is essential as quickly as possible to suture the rents in the intestine or to resect as necessary, and in these circumstances the ureter is hardly likely to be seen even if it is damaged. Basil Hughes, who worked at Salonika, had seven or eight cases, I think, which developed urinary fistula as a result of the wound of the ureter. His advice was to leave them alone, as in his experience the fistula practically always healed up.

Turning now to injuries caused by falling masonry, we may get a patient with a crushed wound in his loin, with symptoms limited to haematuria and no signs of any intra-abdominal damage or internal haemorrhage. In such a case the patient would obviously be left alone and the effect of rest in bed be observed. The only circumstance that would make it necessary to interfere in these cases in which the whole condition appeared to be extraperitoneal would be very severe haematuria that refused to stop after treatment and the development of a large lump in the loin, due to perirenal haematoma. In that case it would be necessary to explore the loin and almost certainly carry out a nephrectomy. To decide as to the function of the other kidney, the simplest expedient is the injection of indigo carmine and a rapid cystoscopy before the operation is done.

In some civil injuries of this kind the haematuria ceases and then starts again within a day or two; or even at a later period, after the patient has got up, there may be recurrent attacks of haematuria. Faced with a condition of that kind the kidney must be thoroughly examined, with the aid of either an intravenous or a retrograde pyelogram, to see if any abnormality is keeping up the haemorrhage. I have observed this take place two or three times when the underlying source of trouble proved to be a hydronephrosis that had been injured

One case of the kind was that of a boy who, while playing rugger, received a kick in the loin. He kept on bleeding and proved to have a large hydronephrosis, though he had had no previous symptom.

Another case I recall was that of a big-game hunter in East Africa, one of the finest-looking men I have ever seen. While going down a narrow glade he was charged by an elephant, and, stepping back behind a tree, he tripped and fell down on the ground. The elephant gave him a jab in the abdomen with the base of its trunk, but by that time one of the bearers, firing his rifle, frightened the elephant away. The hunter was taken on a stretcher made of some branches to the local missionary station thirty-six hours' journey distant, and by the light of the moon that night he discovered that he was suffering from haematuria. The condition settled down; he came back to England, but continued to have several more attacks of haematuria, and on examining him I found perhaps the largest hydronephrosis I have ever seen.

I stress this matter only in order to suggest that in a case of renal injury with persistent bleeding the kidney should be investigated for any underlying cause responsible for keeping up the haematuria.

Obviously with an infected perirenal haematoma we would have to open and drain. That may well be done later in the proceedings, not at the time of the injury. In the case of a person who has had a crush injury of the abdomen and is suffering from haematuria, with all the signs of intra-abdominal damage, with rigidity, pain, or symptoms of intraperitoneal haemorrhage, there would be no alternative but to perform a laparotomy and explore the kidney, and almost certainly a nephrectomy would be necessary. The other intra-abdominal injuries, such as ruptured spleen, liver, or intestines, would also have to be dealt with.

Bladder Injuries

In the case of men shot through the lower abdomen and the bladder by bullets during the war most of the injuries were intraperitoneal rupture of the bladder, although in some cases both intraperitoneal and extraperitoneal injuries were found. Here occurs the added difficulty in that there may be rupture not only of the bladder but of the intestines, and also severe splintering damage to the sacrum or the bones of the pelvis. That is more likely to happen with a jagged high explosive than with a bullet, which may go straight through. The entrance and exit wounds may be found, but the patient remains unable to pass urine. If a catheter be inserted only a little blood-stained urine may be obtained. A diagnosis of bladder injury is then made, and the first thing to do is to excise the wound. If there are signs not only of perforated bladder but of intra-abdominal injury as well, then a laparotomy should be performed. The injured peritoneal wound in the bladder is found and sutured, the injuries to the rectum or small intestine are dealt with, and then either a catheter is tied in or the peritoneum is stripped back and a self-retaining catheter inserted suprapubically—the abdomen, of course, being mopped out. If there is severe damage to the bones of the pelvis and sacrum it is absolutely essential to excise these wounds and remove any bony fragments that are lying about. If the wound is found communicating with the bladder the bladder should be opened and an endeavour made to suture it from the inside. A tube is then put down through the excised wound to the bladder, and the rest of the wound sutured as much as possible, after which the bladder is drained suprapubically. These are the cases in which the damage is caused by fragments of shell or pieces of bone that have not entered the peritoneal cavity. Drainage must always take place in these cases, not only suprapubically but from the entrance or exit wound made by the foreign body. The result may be successful and the whole condition be cleared up. On the other hand, some of these cases, while they show healing, are left with various fistulae. I saw one ex-soldier who passed his urine partly through his urethra, partly through two suprapubic fistulae, and partly near the site where his ischial tuberosity used to be. His injury was sustained in the war, and he is living a fairly normal life.

If the wound is extraperitoneal and the patient is tender suprapubically, on passing a catheter through the entrance wound a fair amount of blood-stained fluid will be found. The thing to do is to excise the wound and track down to the bladder; we may then have the fortune to find in the bladder itself the fragment of shell. In that case it is removed, a Malecot tube is put in, and drainage instituted. If the bullet has gone right through it will have damaged the rectum or the bones of the pelvis. In a case of severe damage to the rectum itself the safest thing is to perform a colostomy temporarily while there is a chance for the wounds below to heal up, because there is no chance at all so long as faecal material is passing over the lacerated wounds. It is always safer to drain a bladder suprapubically than to tie in catheters, especially in the conditions under which war casualties have to be attended. The patient may have to undergo a long journey after the operation, and the surgeon never knows whether the catheter may not get blocked or kinked. On the other hand, the suprapubic self-retaining catheter is always safe.

Crushing wounds of the bladder in war are very much the same as those encountered in civil life in road accident cases, and the injury of the bladder is usually produced by a fracture of the pelvis. The fractured ends of the bone may be driven into the bladder. Here again the bladder may be ruptured intraperitoneally or extraperitoneally. In the former case one finds pain, rigidity of the abdomen, and inability of the patient to pass urine. When the catheter is inserted a little urine is obtained. If a small amount of sterile lotion be injected through the catheter

very little of it comes back. In that case a laparotomy is performed, the intraperitoneal rupture is sutured, the abdomen is mopped out and closed. The safest plan is to strip back the peritoneum and insert a self-retaining catheter through the trocar and cannula.

On the other hand, if the damage is extraperitoneal we may find the bladder palpable, and on passing the catheter obtain a good deal of blood-stained urine. I have employed cystoscopy on one or two occasions to confirm the diagnosis, and could see the rent at the top of the bladder. In cases like that a suprapubic procedure is carried out, the hole in the bladder found if it is anywhere in the median line, the self-retaining catheter and Malecot tube inserted, and the wound sutured around it. The Malecot tube can be taken out after a week.

In considering the bladder the further question of a fractured spine arises. In war there are many fractured spines, and there will probably be a great many more in air raids, as a result both of direct wounds from bombing and of falling masonry.

The question how to treat the fractured spine from the bladder point of view was one that obtained a great deal of consideration during the war, and much varied counsel was given, some of it of a kind that was obviously foolish. Indeed, we were always getting new directions from the base as to what we were to do when a man came in with a fractured spine or pelvis and a distended bladder. First of all we were told that such a case was to be catheterized regularly; but in a clearing station one catheter might be passed, and the patient who was not in pain go down to the base with his bladder greatly distended. The procedure could not be carried out regularly, for the people concerned were much too busy. Then we got orders to tie in a catheter. This was much more sensible, because the patient could drain continuously all the time; but again there was trouble on account of occasional blockage or kinking of the catheter.

By the end of the war we had definitely settled down to what was the best treatment—namely, a suprapubic operation and the insertion of a self-retaining de Pezzer catheter. The great precaution to observe is not to let the bladder overdistend, because the one thing to be hoped for is that sooner or later the patient may develop an automatic bladder. This may take one month or six months. If the bladder has not been overdistended it has still got its muscles, and after a few weeks one can always try, even while suprapubic drainage is going on, whether urine can be naturally expressed. If this can be done then it is known that the patient is developing an automatic bladder, and the suprapubic catheter can be taken out and a catheter tied in with a view to healing.

Injuries of the Urethra

Injuries of the urethra and penis were moderately common during the war and had to be handled as was thought best at the time. I saw cases of a simple through-and-through bullet wound of the penis, also possibly of the scrotum, in which there was no evidence of rupture of the urethra and no extravasation of blood. These cases were just left alone. On the other hand, if it was suspected that the urethra might be ruptured, then an attempt was made to pass a catheter and tie it in. If the catheter would not pass and there was a complete rupture, a urethrotomy had to be performed. In the anterior portion of the urethra this was fairly simple, the urethra being repaired over the catheter. On the other hand, with a urethra ruptured in the bulbous portion the case was treated exactly the same as when a patient in civil life had fallen astride some hard object and sustained a ruptured urethra. If there was a complete rupture a suprapubic cystotomy was done, a retrograde bougie was passed so as to indicate the position of the proximal part of the urethra, and urethrotomy was carried out and the urethra sutured over the catheter. In war wounds it might not be always possible to resuture the urethra, in which case we would have to do the best we could and allow the catheter to act as a splint so as to keep the whole urethra from scarring up.

The other type of ruptured urethra, sometimes seen in civil life too, was the case in which there were injuries to the prostatic or membranous urethra. There is nothing, of course, that a shell or a bullet cannot damage, but the treatment will be much the same. A similar condition is occasionally seen in persons who have been run over in road accidents, the urethra being ruptured between the membranous and prostatic portions and becoming dislocated, so that there is no urethral continuity. In that type of case it is obviously quite impossible for any repairs to the urethra to be carried out in the way of stitching. With a bullet wound the entrance and exit are excised, though in an ordinary case of civil accident there would be no occasion to do that. A suprapubic cystotomy is performed to deal with the two dislocated portions and a large-size bicoudé catheter is inserted down to the penile portion of the ureter. Then, on placing a finger in the prostatic portion of the urethra, it can be moved about until it is opposite the catheter, which is then tied in and acts as a splint.

With regard to the penis everything depends on the extent of the injury. If it is a simple wound straight through no harm may result. On the other hand, it may be a badly lacerated wound, and the only recourse may be to amputation, done in the same way as a partial amputation for carcinoma in civil life, endeavouring to get some skin from what is left of the penis to cover over the raw area and tie in the catheter. There were occasions on which it was possible to excise and repair the wounds and leave the penis, but in the majority of badly wounded cases it had to be amputated.

The same principle applies to wounds in the testicle. Either they were through-and-through wounds which were not bleeding and in which no particular damage had been done, or else they were lacerated wounds of the scrotum out of which one might have a testicle herniating. They were treated exactly as civil injuries, the wound being excised, the testicle removed, and suturing being done.

BEIT MEMORIAL TRUST FOR MEDICAL RESEARCH

A meeting of the trustees of the Beit Memorial Fellowships for Medical Research was held on July 19 for the election of Fellows and other business. The resignations from the Advisory Board of Sir F. Gowland Hopkins and Sir Patrick Laidlaw, F.R.S., were received with regret. These vacancies were filled by the appointment to the board of Dr. R. A. Peters, Whitley Professor of Biochemistry, University of Oxford, and Dr. Paul Fildes, bacteriologist on the scientific staff of the Medical Research Council.

It was in 1910 that the first Beit Fellow, now Sir Thomas Lewis, F.R.S., was elected, and last year's election brought the total of all Fellows elected to exactly 200. Women are eligible and have been elected from 1910 onwards, their total being thirty out of the 200. Of the 170 men, six have been elected to the Fellowship

of the Royal Society, and no fewer than thirty-four have already been appointed to University Professorships, of which five were in physiology, five in pharmacology, five in medicine, and nine in chemistry or biochemistry. The Dominions over-seas hold eight of these past Beit Fellows as present professors. None of the women have yet been promoted to university professorships, though at least six of them are doing work of much distinction, and one has for some years been director of an important research laboratory. The opportunities for a woman to obtain a university chair in scientific subjects are still restricted. Though the Fellows have come from all parts of the British Empire and have subsequently gone to laboratory posts all over the world, in their choice of a place of research during their Fellowships they have tended to group themselves at three main centres. Out of the total 200 the laboratories of Cambridge University have held fifty-five Fellows, and twenty-nine of these were personally directed by Sir Gowland Hopkins in the great biochemical school that he developed in the Dunn Laboratories immediately after their opening in 1925. University College and University College Hospital in London together have provided opportunities for the work of thirty-nine Fellows, and the Lister Institute of Preventive Medicine has accepted thirty-five. The Trust in London for Medical Research has disbursed nearly £190,000 to Fellows since 1910.

Election of New Fellows

The following elections were made:

Fourth Year Fellowships (value £500 a year).—Isaac Berenblum, M.D., M.Sc. To continue his work on the production of cancer by skin irritants and to study the metabolism of living cells in tissue culture (School of Pathology, Oxford University). Thomas Arthur Howard Munro, M.B., Ch.B., F.R.C.P. To continue his studies of the role of inheritance in mental disorders (Royal Eastern Counties Institution, Colchester). Albert Neuberger, M.D., Ph.D. To extend his work on the chemistry of amino sugars in elucidation of the structure of natural compounds (Department of Pathological Chemistry, University College Hospital Medical School, London University). Richard Julius Pumphrey, M.A., Ph.D. To continue his studies on the nervous system of cephalopods and on the auditory processes in insects (Zoological Laboratory, Cambridge University, and the Laboratory of the Marine Biological Association, Plymouth).

Junior Fellowships (value £400 a year).—Vernon Hollis Booth, B.A., Ph.D. Proposed research: (1) the internal constituents of bacteria by means of a wet-crushing mill and (2) carbonic anhydrase (Physiological Laboratory, Cambridge University). Eric George Lapthorne Bywaters, M.B., B.S., M.R.C.P. Proposed research: rheumatoid arthritis (British Postgraduate Medical School, London University). Wilfred Ingram Card, M.D., M.R.C.P. Proposed research: the inhibition of gastric motility and secretion by experimental studies on man (Medical Unit Laboratories and Sherrington School of Physiology, St. Thomas's Hospital Medical School, London University). Hans Heller, Ph.D., M.B., B.Ch. Proposed research: the anti-diuretic principle of post-pituitary extract (Medical Unit Laboratories, University College Hospital Medical School, London University). Maxwell Shaw Jones, M.D., D.P.M. Proposed research: insulin treatment of schizophrenic mental states (Maudsley Hospital, Denmark Hill, London University). Barnett Levin, B.Sc., Ph.D. Proposed research: the effect of spatial configuration of antigens on immunological reactions (Clinical Chemical Laboratories of the London Hospital, London University). Ian Mackenzie, M.B., Ch.B., F.R.C.S. Proposed research: immunological investigations on constituents of tumours (Department of Surgical Research, Edinburgh University). Alexander Francis Rawdon-Smith, M.A., Ph.D. Proposed research: congenital deafness (Physiological Laboratory, Cambridge University). Basil Roland Record, B.Sc., Ph.D. Proposed research: the specific soluble substance found in the tissues in acute vaccinial infection (Lister Institute of Preventive Medicine, London University).

All correspondence of Fellows and candidates should be addressed to Professor T. R. Elliott, M.D., F.R.S., honorary secretary, Beit Memorial Fellowships, University College Hospital Medical School, University Street, W.C.1.

NUTRITION IN THE COLONIAL EMPIRE

The Report on Nutrition in the Colonial Empire[1] published last week is a document of 200 printed pages. It has been prepared by a committee of the Economic Advisory Council under the chairmanship of Lord De La Warr. The committee was set up to consider the information received as a result of a circular dispatch sent out while Mr. J. H. Thomas was Secretary of State for the Colonies. It will continue in being to advise on matters affecting nutrition in the Colonial Empire. Attached to the report is a second volume[2] containing a summary of the information available about nutrition in the different parts of the Colonial Empire. The report contains a foreword by the Secretary of State for the Colonies, who says that "the fact that Colonial Governments have already ordered over four thousand copies of the report indicates impressively the importance which they attach to it and the wide distribution which they contemplate."

The Committee's Findings

The committee has no doubt that improved nutrition could bring very great benefit to the Colonial Empire, not so much by the eradication of disease, though this is important, as by a general improvement in the standard of health and well-being. After a chapter in which the principles of correct nutrition are clearly set out, the report discusses the principal characteristics of Colonial dietaries. The committee finds that they are predominantly vegetarian, in most parts of the Colonial Empire only very small quantities of animal products being consumed. Milk in particular is very rarely consumed indeed. In general Colonial diets are apt to be low in first-class proteins, in fats, and in green leafy vegetables and fruits. Calcium and phosphorus also appear to be widely deficient. Deficiency of vitamin D is not widely reported, but the remaining vitamins appear to be lacking to a larger or smaller extent. The general conclusion is that "there are few of the constituents considered necessary in Europe for a nutritionally adequate diet which are generally available in sufficient quantities in the Colonial Empire." There are few parts of the Colonial Empire, or indeed of any tropical country, where the diet of the majority of the population is at present anything like sufficient for optimum nutrition. Diets are often insufficient in quantity and still more often insufficient in quality. If they are bulky, the bulk is too often made up of foods that do not supply all the needs of a balanced diet. Judged by European standards they lack variety and they lack protective value.

It is not easy to distinguish between the effects of food deficiency and those of infections, such as hookworm or malaria. Nevertheless, there can be no doubt that the effects of malnutrition are serious. In the first place there are many diseases which are known to be directly caused by dietary deficiency. Secondly, there are others which, if not directly caused by them, are at least aggravated by them. Thirdly, an insufficient diet weakens resistance to diseases of all kinds and leads to inefficiency and lack of well-being. The committee has no doubt whatever that these conclusions are correct. It suggests that they should have great significance for Colonial Governments and affect many aspects of Government policy. Money spent on improving nutrition should be a sound investment yielding its dividend in the increased welfare of the community as a whole.

Means for Improvement

The general conclusions reached by the committee only confirm the belief which has been growing up in informed circles during recent years. It has realized, however, that the analysis of the present situation is only a part of its

[1] Cmd. 6050. H.M. Stationery Office. (3s.)
[2] Cmd. 6051. (2s. 6d.)

duty, and the greater part of the report is taken up with the discussion of ways and means of improving matters. The committee throughout has insisted on the necessity for a realistic and practical approach to the problem.

"In Colonial conditions it is not useful to say that the aim should be that every man, woman, and child should consume four or five or six pints of milk a week and that until they do so they cannot be well nourished, for such a state of affairs is far beyond the realms of possibility."

The exact measures to be taken must vary in each territory. The committee has, however, put forward a large number of ideas and recommendations, all of a practical nature, and, as the Secretary of State points out in his foreword, it will now be for each Colonial Government to consider the application of these ideas to its own territory.

Two Main Causes of Malnutrition

The committee considers that the two main causes of malnutrition in the Colonial Empire, apart from the prevalence of diseases, which often have a weakening effect, are, first and most important, the low standard of living, and, secondly, ignorance coupled with prejudice. A subsidiary factor in some territories is the increase of population.

The low standard of living does not necessarily mean in the Colonial Empire, as it would mean in this country, a deficiency of money resources, for in many parts of the Colonial Empire the people are still largely independent of money. What it does mean is that the foodstuffs they produce, supplemented by the money obtained from the sale of produce, wages, or some other source, are very often insufficient to provide adequate nutrition in addition to all their other needs. The reason for this is not necessarily that the available income is badly distributed, that some have too much while the majority have too little. Much more fundamentally it is due to the fact that the total income of the community is at present too low.

Health and Agriculture

The problem is thus largely one of economic development. Primarily in the Colonial Empire economic development means improvements in agricultural production. Predominantly the people of the Colonial Empire get their living by agriculture. Accordingly the committee devotes the whole of the next two chapters to agricultural questions. It shows how necessary it is that there should be close co-operation between the Departments of Health and Agriculture. It is for the Health Departments to say what is deficient in the existing state of nutrition, and for the Agricultural Departments in consultation with the Health Departments to consider how the deficiencies can best be met. The aim of the Agricultural Department should be the establishment of a balanced agriculture which, while safeguarding soil fertility, meets the food requirements of the people and gives them the greatest cash value for the products which they sell.

The committee regards family production of food to meet family needs as most important. It is a great safeguard against the worst social and economic effects of fluctuations of income from money crops, and it has many other merits. Accordingly Colonial Governments should make it their policy that as many people as possible should grow at least part of the foodstuffs they themselves consume.

Improvements in the Dietary

In considering the desirable additions to Colonial diets the first requisite is that the energy needs should be supplied. At the same time energy-giving foods are not enough by themselves unless the other requirements for a good diet are also present, and the committee recommends that a good working rule would be to endeavour to increase the quantity of foodstuffs consumed by increasing the variety.

Where population presses hardly upon the land the energy yield of foodstuffs per acre is all-important. The committee shows that animal products have a low energy yield per acre, but cereals, and particularly rice, a high yield. It then considers in detail the various crops that may be useful for the improvement of nutrition in the Colonial Empire. A combination of cereals and legumes is nutritionally valuable, and special mention is given to soya beans (if properly prepared), groundnuts, red palm oil, and to fruits and green leafy vegetables generally. As regards animal husbandry, increased consumption of animal products is regarded as most desirable (although their energy yield per acre is low), and an increase of animal husbandry should also be beneficial from an agricultural point of view. After discussing the importance of putting the cattle population of Africa to economic uses, the committee mentions that other animals may also play a valuable part.

Milk and Milk Products

A separate section is devoted to the question of milk and milk products. The committee finds that the low consumption of milk products is one of the most striking factors in Colonial diets. Generally little or no milk is consumed after weaning. Milk is often actually disliked. The committee sees no prospect of quantities anything like adequate by Western standards being brought within the reach of Colonial peoples, and it points out the dangers of milk in tropical and sometimes primitive conditions, for fresh whole milk, besides being the most valuable of all foods, may also be one of the most dangerous. These dangers are less present in curds and cheese, since the souring of the milk reduces the liabilities of contamination. The committee notes that there has been a substantial development of ghee manufacture of recent years in some parts of the Colonial Empire. This at least ensures the consumption of fats and of some part of the other constituents of milk without danger to health, but it is wasteful from the point of view of the community as a whole unless the skimmed milk which remains is also used. The committee regards skimmed milk as standing next to whole milk in the order of nutritive value of foods, since it contains all or practically all of the valuable constituents of whole milk apart from its fats and certain vitamins.

Part of the deficiency of milk supplies may be made up by imports of milk products, and in an appendix the committee relates the cost of the various kinds of imported milk to the nutritive value obtained from them. This is a task which has never before been attempted. The conclusion reached is strongly in favour of imports of dried skimmed milk, at any rate for use in bulk. The committee finds that £1 spent on dried skimmed milk will give a very much larger quantity of proteins, calcium, phosphorus, iron, and the B vitamins than the same amount spent on any other form of manufactured milk.

Milling of Rice

The committee thinks that fish is the animal product which may perhaps be more useful than any other in supplementing Colonial diets. It accordingly welcomes the recent appointment of a committee to assist in the development of Colonial fishery resources. It devotes a chapter to discussing the various methods of harvesting, storing, preserving, processing, and cooking of foods, with an appendix by Dr. Platt on the processing of rice. It has long been known that beriberi, which is a disease prevalent among rice-eating people, is due to a deficiency of vitamin B_1 in the diet. Rice in its natural state contains a quantity of vitamin B_1 which should be sufficient, but it is often destroyed before the rice is consumed. Until recently it has been thought that the destruction occurred chiefly during the process of milling. The

appendix to this report shows that even the most highly milled rice may contain quantities of the vitamin which are very nearly adequate if it is properly stored and cooked. This is a conclusion which may be of great importance in rice-eating territories, since so far efforts to persuade people eating highly milled rice to change their habits have met with small success.

The infant mortality rate in many parts of the Colonial Empire is very high, and one of the main causes is the unsuitable feeding. The committee hopes there will be increased attention to infant welfare work. In two final chapters it emphasizes the need for further knowledge in regard to tropical nutrition and for co-operation between various Government Departments if there is not to be waste of effort. As the result of a recommendation made by the committee some time ago an organization has already been set up under Dr. B. S. Platt to organize nutritional surveys in the Colonial Empire.

NEW EVACUATION PLANS

A circular and memorandum issued by the Minister of Health (Circular 1841, and Memo. Ev5) mark a further stage in the working out of plans for the evacuation in time of war of the priority groups for whom provision is to be made under the Government scheme. These groups consist mainly of school children, children of pre-school age and their mothers, and expectant mothers, and the plans now being made are related particularly to the special needs of these groups. The plans so far made apply to the evacuating areas announced in January last, but proposals are under consideration for extending these plans to certain additional areas.

The circular points out that the numbers in the priority groups who have so far been registered for evacuation show a striking disparity between the different evacuable areas. Local authorities are asked to take steps to stress the importance of registration, and house-to-house canvassing is suggested to explain the scheme to mothers of children under 5, the visits so far as possible being paid in the evening when both parents are at home. Reports are to be made to the Minister of the numbers in each priority class registered for evacuation by August 15. Local authorities are asked to draw up lists of persons suitable to act as billeting officers from which appointments can be made when an emergency is imminent. It is suggested that letters should be sent by the local authorities to all householders who have not already volunteered to receive evacuated children reminding them of the obligations imposed by the Civil Defence Act.

An appeal tribunal would be set up in an emergency in each district to which householders aggrieved by billeting requirements might appeal. Each tribunal would consist of three members, of whom one would be a woman. Local authorities are asked to draw up lists of persons from among whom the tribunals can be appointed. The standard of one person to a habitable room will not normally be exceeded; any cases in which the standard is exceeded will be reviewed as soon as possible.

Provision for Expectant Mothers

Special arrangements are to be made for the reception of handicapped children and nursery schools in large houses, camps, and other suitable buildings which can be run as residential homes. The Minister of Health is prepared to consider applications for sanction to expenditure on work which must be carried out in advance. Medical officers of health of counties and county boroughs are to advise on the special considerations which arise in the provision to be made for expectant mothers, and the attention of evacuating authorities is directed to the importance of seeing that adequate numbers of midwives are sent with the expectant mothers. The Royal College of Obstetricians and Gynaecologists have been consulted by the Minister and honorary obstetric consultants have been appointed for seven regions in England and Wales. Emergency maternity homes, the circular states, should be planned in reasonable proximity to the hospital accommodation to be used for difficult confinements.

Local authorities are asked to plan in advance any extra isolation accommodation which will be needed for persons suffering from infectious diseases among the evacuated population, and the county medical officers of health are to be called into consultation with a view to making joint arrangements for suitably wide areas.

MEDICINE AND THE PRESENT EMERGENCY

A Manifesto on "Moral Rearmament"

The following message from members of the British medical profession has been sent to American citizens at the World Assembly for Moral Rearmament, Golden Gate Fair, San Francisco:

"In the continuing uncertainty of world affairs, medical practitioners in common with others are deeply concerned to restore the security essential to normal living. It is vital to create confidence during an emergency, but even more urgent to prevent catastrophe and to lay the foundation of a just and lasting peace. Science has made great advances, but without corresponding moral progress we risk losing even the benefits already achieved. Behind much disease, as behind world unrest, are fear, self-indulgence, jealousy, and resentment. These are problems for which Medicine might provide a radical solution. It is still our privilege to enjoy unrivalled contact with the homes and people of the nation. Our immediate task is to teach men that health is not the mere absence of disease but includes a moral and spiritual foundation for life and the replacing of conflict and apathy with a purpose that claims the whole personality in the service of our fellows. A growing body of people in many countries is calling for this 'moral rearmament' to provide the discipline and the direction needed by both individual and nation. Our profession can give a lead to such a programme which is in accord with the highest ideals of our tradition. To achieve it we realize that the highest standards of honesty and unselfishness must be the touchstone of our professional and private lives. Only through insistence on these spiritual values will the resources of science be liberated and a new world built in which men can attain to their inherited capacity for physical, moral, and spiritual development."

The message is signed by Dr. G. C. Anderson, Sir Thomas Barlow, Lady Barrett, Sir Henry Brackenbury, Dr. H. Guy Dain, Mr. W. McAdam Eccles, Dr. Thomas Fraser, Professor John Hay, Lord Horder, Professor R. W. Johnstone, Sir John Kirk, Dr. Colin D. Lindsay, Sir Ewen Maclean, Dame Louise McIlroy, Sir J. Boyd Orr, Professor Leonard G. Parsons, Dr. Donald Paterson, Professor Lambert Rogers, Sir Humphry Rolleston, Mr. Cecil P. G. Wakeley, Professor Samson Wright, Sir Beckwith Whitehouse, and Mr. Geoffrey Jefferson.

During the proceedings at Aberdeen last week a medical meeting in support of "moral rearmament" was held, with Dr. David Watson in the chair, and the guests were received by Sir John and Lady Orr and Dame Louise McIlroy. Evidence was given of moral rearmament applied to medical practice, and a film was shown illustrating the effect on youth of a new physical and moral fitness. Dr. E. E. Claxton laid stress on the part the medical profession could play in the international sphere; this was supported by Dr. Donald Court, Dr. Alexander Muirhead, and Dr. Mary McNichol. On the proposal of Sir John Boyd Orr a resolution in the sense of the message printed above was adopted by the meeting.

Apart from the organization of a hospital for psychiatric casualties under the Ministry of Health, in conjunction with the West End Hospital, the Tavistock Clinic has arranged, should war arise, to transfer its work for ordinary neurotic out-patients to Westfield College, Hampstead. It has also been arranged that the private consulting and treatment work of members of the clinic staff shall be carried on in the same building from the day of the outbreak of any hostilities.

ONE HUNDRED AND SEVENTH ANNUAL MEETING

of the

British Medical Association

HELD IN ABERDEEN, JULY, 1939

THE SECTIONS

SUMMARY OF PROCEEDINGS

During the next few months there will be published in the BRITISH MEDICAL JOURNAL *most of the opening papers communicated to the Scientific Sections of the Annual Meeting at Aberdeen. The reports of the discussions in this and successive issues are intended to give members who were not present a general idea of the proceedings.*

JOINT DISCUSSION OF FIVE SECTIONS

Wednesday, July 26

Sulphanilamide in Chemotherapy

With Professor DAVID CAMPBELL in the chair, Professor C. H. BROWNING and Dr. G. A. H. BUTTLE opened a discussion on the present position of chemotherapy by means of drugs of the sulphanilamide group. Both papers are published in this issue.

Dr. H. STANLEY BANKS continued the discussion with reference to the treatment of meningococcal meningitis. During the past two years the Park Hospital was the centre of treatment of all acute cases referred to the L.C.C. The first sixty-five cases were treated by intravenous serum as well as sulphanilamide, with a mortality of 12.3 per cent. In twenty-eight subsequent cases sulphanilamide alone was used, and there were no deaths. M & B 693 alone was given to thirty-four patients, of whom only one, gravely ill on admission, died. The speaker considered that dosage should be sufficient to maintain a spinal fluid concentration of 5 mg. per 100 c.cm. of fluid for three days, and a lesser concentration for a further period of five or six days. In infants an appropriate dose would be 3 grammes daily, while 9 grammes daily would be necessary for an adult. Three deaths occurred among twelve patients having lower spinal fluid concentrations than 5 mg. per 100 c.cm. of fluid, and it was inferred from this that low initial dosage was distinctly unsafe. There was no evidence that auxiliary serum treatment was desirable or that it compensated for low dosage, or too rapidly diminished dosage, of sulphanilamide. Similar high dosage was recommended for M & B 693, although lower dosage of this drug might sometimes be successful. While chemotherapy was applicable to persons of all ages, further experience was required for prognosis in the age group over 40. If vomiting prevented the usual oral administration of M & B 693, intramuscular injections of the sodium solution could be employed. Before the introduction of the sulphanilamide preparations intensive antitoxin therapy had been in use from 1933 to 1937, the gross mortality being twenty-one out of fifty-nine cases, or 35.6 per cent.

Dr. F. J. T. BOWIE (Aberdeen), discussing the treatment of gonorrhoea by sulphonamides, said that the preparations chiefly in use were sulphanilamide, uleron, and M & B 693. Of these the first produced cure in about 80 per cent. of cases, and the second in 80 to 90 per cent. By means of M & B 693 an even greater percentage of cures could be effected; this drug had the additional advantage that it did not necessitate delay in its use until the eighth or tenth day of the disease, as was the case with sulphanilamide and uleron. Dr. Bowie grouped together the statistics of nine authorities, making a total of 810 cases, and showed that the average rate of cure or early cure was 88 per cent. Moreover, less than 1.5 per cent. developed complications, compared with the approximate 30 per cent. complication frequency among patients not treated by chemotherapy. An intensive method of treatment was being tried whereby males received a total of 20 grammes of M & B 693 over a period of four to five days. Although this system was attended by a greater frequency of gastric symptoms in the early stages it appeared to promise a higher rate of cure. The speaker further quoted the results of Dr. A. M. Michie at the City Hospital, Aberdeen, who had treated eight cases of gonococcal ophthalmia neonatorum; all were gonococcus-negative in two or three days, and the stay in hospital averaged seven to ten days.

Dr. WILFRID F. GAISFORD (Birmingham) recounted his experience of chemotherapy in pneumococcal infections of the lungs. Since the introduction of these drugs there had been a conspicuous fall in the mortality rate of lobar pneumonia; of 627 patients treated for this disease at the Dudley Road Hospital only thirty-five died, and three-quarters of these were over 50 years of age. This represented a mortality of 5.4 per cent., compared to the figures of 20.5 per cent. and 20 per cent. for the years 1936 and 1937. Bronchopneumonia was apt to be due to a mixed infection, and this disease was not benefited to the same extent by sulphonamide therapy. There had been eighteen deaths among 196 patients treated, compared to thirty-six deaths among 211 in 1937. The upper respiratory tract infections of children responded well to these remedies. Dr. Gaisford had observed the development of clear effusions in some cases, although the incidence of empyema had not increased; it seemed probable that the effusions corresponded to aborted empyemata. M & B 693 had been given to more than a thousand patients at the Dudley Road Hospital without any serious toxic effects occurring. He attributed this to the fact that intensive treatment was given early, and for short periods, while no ambulatory cases were treated.

Dr. A. MEAVE KENNY (London), referring to the use of sulphonamides in puerperal infections, said that she regarded red prontosil as the most effective preparation in streptococcal infections. At the Queen Charlotte's Hospital Isolation Block the mortality rate for the five-year period up to 1936 was 22.8 per cent. Following the introduction of prontosil the average mortality for 1936–7–8 was 5.7 per cent. The figure was lowest at 5.3 per cent. in 1936, red prontosil being used. The average dose for the sixty-eight patients treated during that year was 18 grammes, as against the very much larger doses of sulphanilamide and M & B 693 required to bring about the same effect. It was possible that patients were being overdosed, especially in view of the risk of agranulocytosis. It appeared that 50 grammes was the danger level. Whereas there were only two published cases of death from agranulocytosis due to prontosil, there were some thirty-five due to sulphanilamide and M & B 693. The latter preparations had to be given in dangerous dosage in order to produce the same effect as safe doses of red prontosil. Furthermore, Dr. Kenny had found that all the undesirable non-fatal side-effects were more marked with the colourless compounds. She pleaded for a return to the original red prontosil and the original moderate frequently repeated doses suggested by Colebrook and herself in 1936. Large doses were dangerous during pregnancy, and *B. coli* pyelitis in pregnancy was readily cured by small dosage—for example, 1.5 to 3 grammes daily. The prophylactic possibilities of these drugs must not replace rigid asepsis.

Dr. W. R. SNODGRASS (Glasgow) advocated a conservative attitude in the clinical appraisement of new drugs. He considered that there was no controlled work available on which to assess the value of sulphanilamides in tonsillitis, but these drugs might most suitably be employed when the lesion was acute, widespread, and invasive. One gramme of sulphanilamide might be given four-hourly to an adult for three to five days, and thereafter 1/2 to 1 gramme thrice daily for a further five to seven days. With regard to scarlet fever, he had a series of 340 cases, carefully controlled and recently examined in Ruchill Hospital, but had found no benefit from

the use of sulphanilamide or benzyl sulphanilamide. Controlled observations on 824 patients with erysipelas at the same hospital led to the conclusion that prontosil "red" or sulphanilamide should be given in doses of 1.5 grammes or 1 gramme respectively every four hours until the lesion ceased to spread and toxic symptoms and pyrexia had disappeared. Thereafter 1 gramme thrice daily for fourteen days should be given to prevent relapse. Dr. P. MANSON-BAHR referred to the action of sulphanilamide in tropical diseases. It was a peculiar fact that whereas sulphanilamide was extremely effective against *Plasmodium knowlesi* in the monkey, no influence upon malaria in man had been observed. In sufficient concentrations this drug was lethal to *Brucella melitensis* and *Brucella abortus* in the guinea-pig, but the results in human infection were less definite, possibly owing to insufficient dosage. Benefit had been claimed in tetanus and actinomycosis, as in Madura foot. Dr. W. R. THROWER felt that a critical review of failures and setbacks in sulphonamide therapy might bring more progress than a survey of successes. Supposed complications, such as haematuria and neuritis, might be no more frequent during such treatment than in the disease treated by other means. The assessment of the effects of treatment was rendered difficult by the variable individual response and the special clinical features in different epidemics. Dr. T. ANDERSON (Glasgow) considered that it was essential for case reports to indicate the type of organism concerned. While Dr. Gaisford had found effusions more common during treatment of Type I pneumococcal infections, he had found them commoner in Type II. This was due to the preponderance of Type I cases in the former series and the predominance of Type II in his own series. He agreed with Dr. Meave Kenny that there might be some special therapeutic activity in the "red" compounds which had been in use in the early days of sulphonamide therapy. Professor E. FARQUHAR MURRAY (Newcastle-upon-Tyne) saw the efficacy of chemotherapy in puerperal fever reflected in the decreased frequency with which physicians encountered such cases. He deprecated the tendency to give sulphonamide preparations merely because the patient had a raised temperature and before a definite diagnosis had been made. He was doubtful how far these drugs were beneficial when focal was added to general infection. Dr. E. N. MACDERMOTT (Galway) thought that surgeons were operating upon greater numbers of empyemata since the introduction of chemotherapy. He considered that the use of sulphonamides inhibited resolution in pneumonia, and that thick or "laudable" pus did not form so readily in, for example, adenitis. It seemed possible that the leucopenia so often seen was responsible for these effects. Sir BECKWITH WHITEHOUSE (Birmingham) deprecated the irresponsible use of these preparations as the immediate treatment of fever; they should not be used diagnostically. Like Dr. MacDermott, he was inclined to think that slow sclerosing phenomena might follow sulphonamide therapy.

Professor DAVID CAMPBELL (Aberdeen) considered that the variable effects of sulphonamides were due to the operation of three variables: the rate of absorption; the rate of acetylation; and the rate of excretion. He had met one example of haematuria with complete suppression for eight days; during this time the blood concentration remained high, although administration had ceased. He drew attention to the method of rectal administration if the oral route failed. M & B 693 suspended in a small bulk of saline would be readily absorbed provided the solution was alkalinized. While methaemoglobinaemia was easily provoked by M & B 693, sulphaemoglobinaemia was more often produced by sulphonamide. Intravenous methylene-blue would clear up methaemoglobinaemia rapidly.

SECTION OF ANATOMY AND ANTHROPOLOGY

Wednesday, July 26

Physical Training

Professor H. A. HARRIS (Cambridge), opening a discussion on the anatomical and physiological basis of physical training, described the pattern of growth in the spine, upper limb, and lower limb, with particular reference to the complexity of the articular surfaces of the joints, the epiphyses, and the heterogeneity of materials involved, including articular cartilage, epiphysial growth cartilage, calcified cartilage, and bone. This, in the spine, was complicated still further by the complex structure, pattern of growth, and properties of the intervertebral disks. The spine of man differed from that of quadrupeds in the substitution of thin annular vertebral epiphyses for thick plate-like epiphyses, in overgrowth of the disks, and in overgrowth of the lumbar spine—both vertebrae and disks—in accord with the great growth in length of the lower limb and great development of buttocks, quadriceps, and hamstrings. This was an important aspect of the assumption of the erect attitude in man. Posture was considered as a nervous mechanism, and emphasis was laid on the importance of the righting reflexes, which were physiological, inherent, and developed at an early age. The nervous mechanism of posture was an ancient heritage, modified in particular in man by the acquirement of stereoscopic vision and the dominance of ocular reflexes. Food, play, and free unorganized games in early childhood were the basis of healthy growth and physical training. There was no index of physical fitness or efficiency. The establishment of a false one would produce inferiority complexes.

Mr. E. SOLLY (Harrogate) offered in support of Professor Harris's approval of voluntary exercises, as contrasted with organized "physical jerks," a reminiscence of his boyhood when he heard an elderly Londoner say that he attributed his health to taking daily equestrian exercises, as it "shook his liver up." A medical friend suggested, "It does you good just because sitting your horse maintains the tone of your abdominal muscles, and so prevents your liver from being shaken up." The physiological value of spontaneous exercises, as in games, was infinitely greater than that obtained by organized drill.

Professor DAVID WATERSTON (St. Andrews) remarked on the fact that individuals might not perform movements in the proper way, and that by training it was possible to teach them the correct method of action. He instanced the slovenly gait or attitude of certain individuals, and indicated how it might be improved by training.

Professor R. D. LOCKHART (Aberdeen) agreed in large measure with Professor Harris's concluding remarks, but considered that the physical training teachers and the orthopaedic surgeons were wide awake as to the possible dangers of certain exercises. He stressed the importance of the muscles controlling joint movements, and suggested that Professor Harris in his remarks upon the vertebral column had lost sight of the all-important part played by the hamstring muscles.

Professor HARRIS, in his reply, mentioned the discrepancy between apparent physical build and physical prowess as represented by certain boxers and professional runners. He also asked that slovenliness of dress should not be confused with physical build.

Growth of Aberdeen Infants

Professor ALEX. LOW (Aberdeen) described how, by permission of the late Professor R. G. McKerron, anthropometric records were made of over 1,000 infants born in the Aberdeen Maternity Hospital, and with the co-operation of the Public Health Department at the Child Welfare Centre fifty males and fifty females of these infants were re-examined at yearly intervals up to 5 years of age. The infants up to the third birthday were weighed and measured unclothed; children of 4 and 5 were weighed with a minimum of clothing, the average weight of which was deducted. The mean weights at birth—boys 7.7 and girls 7.59 lb.—were of interest in that there was little difference between the weights of the sexes; the Aberdeen infants were also from 5 to 6 oz. heavier at birth than the published figures given for other towns. The table of mean weights and gains showed that from the second year the rate of increase was somewhat greater for girls, so that at the fifth year the girls were slightly superior in weight—boys 36.277 and girls 36.333 lb. The

mean heights at birth—boys 19.708 and girls 19.488 inches—were somewhat under the usually accepted figures; at 5 years these children were over an inch taller than Edinburgh and Dundee children, the mean heights being for boys 41.242 and for girls 41.334 inches. The important bearing of the pre-school years on the future of the individual was emphasized. In Aberdeen the average working-class mother was wonderfully efficient and appreciative of the educative value of the child welfare centre. In the absence of reliable British standards, tables and graphs of growth were mostly based on American figures. Reliable observations from a statistical point of view on the growth of individual children were much needed in this country.

Professor H. A. HARRIS said that present expenditure on the medical examination of school children was largely wasted because there were serious gaps at the two ends—pre-school and post-school. A much more reliable set of data could be obtained if there was more continuity, while accurate observations on dentition and on the special senses were urgently required. He pointed out that more was known about the embryology and growth of chickens, rats, etc., than about human beings.

Professor R. D. LOCKHART (Aberdeen) remarked that this was the first time, so far as he was aware, that measurements of the same individual children had been obtained over the first five years of life. He stressed Professor Low's accuracy as an observer, pointing out the added value of his figures on this account.

Professor LOW, in his reply, emphasized that the question of dentition had been studied, and that much variation in the time of eruption and onset of decay had been encountered. Closure of the fontanelles and skull growth were also noted carefully, and he remarked on the precocious development in the first two years of life.

Fitness in a Selected Age Group

Dr. JAMES K. SLATER (Edinburgh), in a paper on "The State of Fitness in a Selected Age Group with Reference to Edinburgh University," described first his methods of examination and showed samples of his record cards. Well over 1,000 students attending Edinburgh University had been examined, some only once, but many over a period of nine years. Height, weight, posture, chest measurements, waist measurements, etc., were specially noted, and he drew attention to the difficulties of grading, while giving comparative figures for various years and nationalities. The condition of flat feet was found to be surprisingly common, over 30 per cent. of the students examined showing this feature. Tables of blood pressure had been prepared, including comparative figures for different nationalities, and several interesting points emerged in connexion with the effects of sport on the blood-pressure readings. Miscellaneous figures were given relating to nutrition, dentition, eyesight, hearing, etc., and the lecturer emphasized the increased adaptability of students for various sports after training under Colonel R. B. Campbell, the University director of physical education.

Professor A. LOW (Aberdeen) agreed that physical training had the effects stated, judging from the results obtained in Aberdeen under the directors of physical education, and added that in Aberdeen University a medical officer who examined students periodically had also been appointed.

Professor H. A. HARRIS said that routine *x*-ray examination would be highly desirable, and would reveal a high incidence of tuberculosis in medical students. He also thought that a follow-up system after the students had left the University was desirable. Dr. G. A. G. MITCHELL (Aberdeen) stated that in Aberdeen, where a large number of first- and second-year medical students had been examined radiologically, no unduly high incidence of pulmonary tuberculosis had been discovered.

Dr. SLATER in his reply said that the most common causes of ill-health among students were undoubtedly tuberculosis and gastric ailments, and on the Continent, where information was more readily obtained, the incidence of venereal disease was stated to be high. In Edinburgh a Diploma of Physical Education was now granted to those who achieved a certain standard of proficiency under the carefully devised system of Colonel Campbell, in which dexterity and alertness were combined in such a way as to reduce monotony to a minimum.

Professor R. D. LOCKHART showed a cinematograph film of controlled movements of the shoulder girdle taken at the Bergmann-Österberg Physical Training College, Dartford, and also a film made by Professor Bradley M. Patten, Director of the Department of Anatomy, University of Michigan, entitled "Microcinema Studies of Bird Development."

SECTION OF NEUROLOGY AND PSYCHIATRY

Wednesday, July 26

Headache as an Early Symptom

With Dr. C. P. SYMONDS, President of the Section, in the chair, Professor HENRY COHEN (Liverpool) and Dr. DESMOND CURRAN opened a discussion on the importance of headache as an early symptom of nervous and mental disorder.

Professor Cohen said that headache as a symptom of intracranial disease occurred (1) in expanding intracranial lesions: (*a*) in connexion with "tumours" in the wider sense, and (*b*) in brain swelling due to oedematous or inflammatory changes, vascular lesions, or trauma; (2) in meningeal irritation; (3) in disease of the cerebral arteries; and (4) in a miscellaneous group with no demonstrable gross pathology—for example, post-traumatic headaches, migraine, and epilepsy. From an analysis of the clinical histories two types finally emerged. The first accompanied lesions of the brain which trespassed on the space occupied by normal structures, or which usually, though not invariably, by disturbances of vascular tone interfered with the utilization of oxygen by the brain. On the analogy of cardiac pain Professor Cohen suggested that such headaches might be due to cerebral anoxia. The headaches of migraine, hypertension, and headache occurring after encephalography could be relieved by inhalations of pure oxygen. The second type of headache was associated with meningeal irritation. The commoner pitfalls in diagnosis could be avoided by remembering the following aphorisms. (1) Progressive headache must be regarded as organic until the contrary was proved. (2) Migraine coming on after the age of 40 invariably pointed to gross intracranial disease. (3) Recurring unilateral migraine followed by ocular paresis was almost diagnostic of basal intracranial aneurysm. (4) Recurrent "cyclical" vomiting with severe headaches in children usually meant a posterior fossa tumour. (5) The diagnosis of psychogenic headache must be based on positive evidence, not solely on the absence of any evidence of organic disease. (6) Many intracranial lesions, even tumours, ran their course without headache occurring at any time.

Dr. Curran said that the diagnosis of "functional" headache could not be made merely by exclusion of all possible physical causes. Positive features had to be established to supplement the negative approach of a diagnosis made solely by exclusion. The head was not only physically experienced, but was also psychologically experienced as the place where the ego was localized. It was therefore easy to understand how any threat to the ego or personality was experienced subjectively as head discomfort or a headache, and hence why this should be such a frequent symptom in mental disorder. The characteristics of a "functional" headache were two. (1) It was related to the quality of closeness as opposed to remoteness to the personality. It was not so much typically a sensory perception as an unpleasant experience with a special personal significance. (2) A "functional" headache was a selective disturbance of function and its variability accorded with psychological rather than with physical events.

Mr. D. W. C. NORTHFIELD dealt with headache in expanding intracranial lesions. Frontal headache happened in 95 per cent. of cases of supratentorial tumour and in 75 per cent.

of infratentorial tumour. Pain in the back of the head and in the neck, if an early symptom, might be of localizing value, indicating a herniation of the cerebellum or a tongue of tumour through the foramen magnum. Occipito-cervical pain as a late symptom might be due to herniation of the inner lips of the temporal lobes through the opening in the tentorium. Persistently unilateral headaches were usually on the same side as the intracranial lesion. In 36 per cent. of intracranial tumours headache was the initial symptom. The relation between the headache and the intracranial pressure was of great interest, as severe headache might arise with low intracranial pressure, and, conversely, with high intracranial pressures headache might be absent. He thought that sudden variations in intracranial pressure might cause pain. Headache in expanding intracranial lesions was not due to pressure or tension on the dura mater, as had been taught previously. Headache might rather be regarded as visceral pain, set up by an abnormal state of tension in the walls of the cerebral blood vessels, signifying the perilous position of the brain.

Professor G. W. PICKERING said that a subject could distinguish only two qualities of pain. The first arose from skin and was usually described as pricking if the stimulus was short, burning if the stimulus was prolonged. It was accurately referred to the point stimulated. The second arose from deep structures and was described as aching or dull. It was often referred to an area remote from the point stimulated, and the subject was unable to distinguish from the nature of the pain alone what structure was stimulated. Both types of pain might be experienced in the region of the cranial vault. The majority of headaches belonged to the second type of pain and arose from deep structures. The chief kind of disturbance in the cranial cavity producing pain seemed to be mechanical. In histamine headache and pyrexial headache the disturbance appeared to be a distension of the walls of the intracranial arteries. This might be shown by the relief of pain which was produced either by digital compression of one carotid artery in the neck or by subarachnoid injection of saline, measures which respectively decreased the pressure inside and increased the pressure outside the intracranial arteries. There were probably other disturbances in the cranial cavity which gave rise to headache, but he was doubtful whether cerebral anoxia was one, first, because cerebral thrombosis, unlike coronary thrombosis, was usually a painless event; and, secondly, because in oxygen lack headache was a delayed event which commonly took place after exposure to low oxygen pressures. Other deep structures sometimes giving rise to pain were the skull in syphilitic osteoperiostitis, and the muscles and tendons overlying the bone, as in so-called "nodular headache" or fibromyositis of the head and neck. Professor Pickering thought that the headaches frequently experienced by otherwise healthy subjects when they were anxious or tired were due to prolonged contraction of muscles such as the frontalis, because in his own case such headaches were relieved at once by conscious relaxation of the muscles.

Dr. T. A. ROSS agreed with Dr. Curran that neurotic patients did not really have headache but suffered from some emotional feeling of discomfort. There were no words which really expressed these feelings, and the word "headache" was used for want of a better. If the doctor saw the patient more than once, he would soon be able to get him interested in other aspects of his case, his history, complexes, and so forth, and he would often cease to talk of his headaches, which seemed to have petered out.

Mr. NORMAN DOTT (Edinburgh) agreed that endocranial pain probably arose from the blood-vessel walls, mainly by dilatation but also by mechanical displacement. This conclusion was based on observations on the intracranial blood vessels during craniotomies and on the extracranial blood vessels during bouts of headache. In intracranial aneurysm headache was localized, and preceded for a long time the rupture of the aneurysm. Arteriosclerotic disease of the cerebral blood vessels was associated with headaches. The fact that in toxic states pain was felt in the head rather than in other parts of the body might be due to the poor vasoconstrictor control of the endocranial vessels as compared to other parts of the body. He thought that "psychogenic" headache was a clearer and better term than "functional" headache. "Psychogenic" pain was as true a pain as any other. He believed that psychic functions had their basis in neural activity, and disorder of the pain mechanism of the intracranial contents might arise in this way. Dr. RICHARD EAGER (Exeter) said that the fact that many cases of headache were due to eye-strain and refractive errors had not been mentioned. He knew of many cases where the correction of refractive errors by suitable glasses had produced immediate relief of long-standing headache. It was the slighter refractive errors that produced the worst headaches.

Dr. D. R. MACCALMAN (Aberdeen) said that two characteristics of psychogenic pain were, first, its unbearable character, and, secondly, its resistance to drugs, although sleep would relieve it. It was the underlying cause of the pain that was unbearable rather than the pain of the headache itself. He referred to other cephalic dysaesthesias, and he particularly associated the "tight band" and "creeping" vertical headache with fear of insanity. Patients could usually distinguish between psychogenic and organic headaches, but did not see the significance of the distinction, for they regarded both as organic in origin. It was always important to determine how useful the headache was to the patient.

Dr. MACDONALD CRITCHLEY observed that one type of migraine without gross intracranial pathology—menopausal migraine—might start after the age of 40. He would like to add another aphorism to those enunciated by Professor Cohen. When unilateral migraine was accompanied by pulsatile tinnitus, this pointed to cerebral angioma. Blind subjects did not often suffer from migraine. Headache might be an important symptom of toxaemia, as was pain in the small of the back. He thought that the psychogenic pain was "real" pain because an individual with hypnotically induced pain produced the same records on a psycho-galvanometer as did an individual with real pain. Dr. Critchley did not think the pain of fatigue state arose in the muscles. It was an uncommon symptom in myasthenia gravis, disseminated sclerosis, and other asthenic states. Dr. W. S. MACLAY thought that if headache was only one symptom of a psychiatric syndrome such as an anxiety state or depressive state, it was wise not to pay too much attention to the symptom but to treat the syndrome in the confident anticipation that if such treatment was successful the headache would disappear. In those cases in which headache was a prominent symptom and the individual was one of those inadequate or psychopathic persons who are so difficult to treat, treatment by relaxation exercises which could be taught to the patient had proved useful.

Professor HUGH CAIRNS (Oxford) believed that sudden alterations in intracranial pressure were an important factor in causing headaches, but that there was a meningeal factor as well. He had demonstrated that pressure on the under surface of the tentorium could cause pain behind the eye. Patients who went blind from intracranial tumours rarely suffered from headaches, and the ocular factor in the causation of headache was worthy of notice. He thought it unlikely that partial anoxia was a cause of headache. Severe headache might occur as the presenting symptom in cases of early dementia with low intracranial pressure.

The PRESIDENT emphasized the importance of accurate history-taking in the clinical investigation of headache. Even intelligent and introspective patients found it difficult to put their sensations into words. Psychogenic headaches could be recognized by the fact that what the subject felt was rarely pain, but rather a misery in the head expressed as some abnormal sensation other than pain. The continuity of psychogenic headaches was of great value in diagnosis. Any headache continuously present for three or four weeks was likely to be functional. In such cases it was more important to inquire into the history of the patient's sleeping and the possibility of recent anxiety and stress rather than to question the patient directly about symptoms referable to the eyes or nasal sinuses. He regarded the quasi-migrainous attacks in basal aneurysm as

due to intermittent increase in tension in the walls of the sac. The intense pain at the outset of a subarachnoid haemorrhage might be due to actual rupture of the wall of the aneurysm.

In reply, Professor COHEN said that the underlying factors in the production of headache might be twofold. Either in the vessel walls there was a sensory mechanism, the adequate stimulus for which was alteration in tension, or as a result of stimulation of the vessel walls there was an alteration in calibre affecting the blood supply to the area supplied by the vessel. He postulated a local and not a general anoxia, and he thought that cerebral thrombosis was not infrequently accompanied by severe and even localized pain, although it might be painless, just as a coronary thrombosis might be painless.

Dr. CURRAN said he preferred the term "functional" headache to "psychogenic" headache. In the headache of an endogenous depression one might search in vain for a psychogenic cause. The reality of the pain in these cases was not in question. It was rather how much of the sensory component was present, or how much an emotional feeling of a disagreeable kind.

SECTION OF OTO-RHINO-LARYNGOLOGY

Wednesday, July 26.

Bronchoscopy

A discussion on the role of the bronchoscopist in the treatment of broncho-pulmonary disease was opened by Dr. CHEVALIER L. JACKSON (Philadelphia). Mr. H. BELL TAWSE (Nottingham) was in the chair. Dr. Chevalier Jackson outlined the history of endoscopy during the past fifty years. The continued advances in technique had aroused widespread interest, so that more cases were coming forward, and more surgeons were taking short courses in the specialty. The main indications for diagnostic bronchoscopy in respiratory diseases were productive cough, haemoptysis, wheezing, and bronchial obstruction, in cases with atypical physical signs. Bronchoscopy was indicated in the treatment of pulmonary abscess, massive collapse, bronchial obstruction, so-called unresolved pneumonia, and occasionally in pulmonary tuberculosis. The question who should perform the bronchoscopy—the oto-rhino-laryngologist, the physician, or the thoracic surgeon—depended upon local conditions and upon the personnel available. He showed lantern slides illustrating typical conditions and went on to discuss the condition of post-operative atelectasis. Bronchoscopic aspiration rapidly cleared this condition, which he thought was due to the presence of thick viscid secretion in the bronchioles, cough having been abolished by sedatives or inhibited by pain. He thought cases of "unresolved pneumonia" were often cases of atelectasis, which, if untreated, would develop into bronchiectasis. He then showed a colour film illustrating the technique of passing the laryngeal spatula and the bronchoscope, and the methods of aspiration and removal of tissue for biopsy.

Dr. EWART MARTIN (Edinburgh) said that great advances in thoracic surgery had raised hopes of controlling malignant disease of the lung, but operative measures must fail unless the disease was recognized early. The clinical diagnosis of primary carcinoma of the lung lay in the hands of the bronchoscopist. Of 216 cases of bronchial carcinoma seen at Edinburgh Royal Infirmary during the past five years only thirty-four were referred for bronchoscopy. Not one was operable when diagnosed. Either there was a lack of co-operation or cases were reporting too late. It should be possible to diagnose carcinoma of the lung by endoscopy before it could be demonstrated radiologically. Only in the early case was operation likely to succeed. Was our endoscopic training sufficient to justify this responsibility of early diagnosis? Better training would ensue if combined clinics were formed by the various otological departments of one area; to such clinics all endoscopic cases could be referred. Endoscopy and thoracic surgery might be developed side by side in specialized clinics. He made a plea for increased facilities for practising on animals, especially dogs, and for the greater centralization of endoscopic cases. There was still a tendency to consider endoscopy a difficult operation, whereas in practised hands it was a simple examination. He thought that the bronchoscopist should decide which cases should be referred to the thoracic surgeon.

Mr. V. E. NEGUS described the mechanical head-rest he had elaborated from Haslinger's model, which enabled the operator to be independent of specially trained assistants. Local anaesthesia was suitable for bronchoscopy in adults, but for children rectal paraldehyde should be preferred. Oesophagoscopy called for combined basal and intratracheal anaesthesia in almost every case. Bronchoscopes had been modified slightly to increase the lumen, and oesophagoscopes were of wide calibre to give a comprehensive view. Twin lamps obliquely set were employed in the oesophagoscopes and laryngoscopes to provide a bright light directed forward. A movable self-contained trolley containing a suction pump and rheostats for lighting was of great assistance. Finally, he showed a film illustrating the instruments and the details of technique.

Mr. E. GILROY GLASS (Nottingham) maintained that bronchography by the injection of radio-opaque oil was an adjuvant to bronchoscopy, and was indicated in those cases in which the lesion was beyond bronchoscopic vision. The value of bronchography was enhanced if the technique adopted permitted of controlled filling of any individual lobe of the lung. The simplest technique meeting this requirement was the passage of a catheter through the larynx and the injection of oil under fluoroscopic control. The exact technique and a new radio-opaque catheter to facilitate orientation were described and illustrated by a film.

The President, Mr. H. BELL TAWSE, expressed the thanks of the meeting to all speakers, and especially to Dr. Chevalier L. Jackson. Among the points for discussion was the question of co-operation between laryngologist, physician, and thoracic surgeon. He thought the voluntary and municipal hospitals should pool their material and resources and that licences for practice on animals should be made available for assistants, so that they could master the technique. Mr. C. A. SCOTT RIDOUT (Portsmouth) emphasized the need for the co-operation of the general practitioner and hoped that an appeal would be made to all practitioners for their aid in the early diagnosis of pulmonary carcinoma. In the smaller clinics the thoracic surgeon would need the help of the laryngo-bronchoscopist, though he might himself perform bronchoscopy if trained. Surely more training on animals should be permitted, as often these animals were brought as patients with foreign bodies in the oesophagus. Cases were quoted showing ultimate good results after repeated bronchial suction and lavage. He advocated local anaesthesia for bronchoscopy. Mr. P. R. ALLISON (Leeds), speaking as a thoracic surgeon, considered that he should perform bronchoscopy himself, unless it were possible to have a bronchoscopist always available. He stated that 95 per cent. of carcinomata of the lung seen bronchoscopically were inoperable, even when the symptoms were recent.

Mr. I. SIMSON HALL (Edinburgh) stressed the importance of bronchial aspiration as a preventive of post-operative pulmonary complications. He emphasized the part played by sinus infection in cases of early lung suppuration or bronchitis. Mr. T. RITCHIE RODGER (Hull) and Mr. DONALD WATSON (Bradford) supported the use of the Negus head-rest, maintaining that team work was impossible in small centres. Mr. J. ADAM (Glasgow) asserted that in cases of bronchiectasis postural drainage was better than bronchoscopic suction. He asked Dr. Martin how often haemoptysis was a symptom in his cases, and Dr. Jackson whether he practised aspiration in cases of asthma. Mr. F. R. EDWARDS (Liverpool) said the question of bronchoscopist *versus* thoracic surgeon rested on what the surgeon wanted to know. Before operation the surgeon must have had a personal view of the lesion. Haemoptysis in patients over the age of 40 called for early bronchoscopy. A delay of a week or two might render the operable case inoperable. The combination of bronchoscopy

and bronchography was recommended. Dr. H. A. McCoy (Adelaide) asserted that before condemning deep *x*-ray therapy the size and extent of tumours of the lung should be known and an adequate dosage should have been given. Mr. J. D. McLAGGAN asked if anyone had had any experience of tomography.

Dr. CHEVALIER JACKSON, in reply, said that postural drainage in cases of lung abscesses was extremely valuable, but it was much more effective when combined with occasional bronchoscopic aspiration. He never advocated aspiration during the height of an asthmatic attack. He agreed that the thoracic surgeon should view the lesion either by himself or with the bronchoscopist. He favoured lipiodol injection through the bronchoscope. In his experience he had never seen prolonged arrest of any malignant growth of the lung follow deep *x*-ray therapy. He had not yet had sufficient experience of tomography. Dr. EWART MARTIN visualized the establishment of clinics for non-tuberculous diseases of the chest. If the thoracic surgeon was to replace the bronchoscopist he must be prepared to undertake all bronchoscopies. Mr. NEGUS agreed that postural drainage was of value, especially in young children, but in many cases of bronchiectasis granulation tissue and the swelling of the mucosa prevented such drainage until the condition was relieved by bronchoscopy and suction. A point in the diagnosis of carcinoma of the bronchus was that the opacity seen radiologically might be due to some extent to collapse and excessive secretion from obstruction: a further radiograph after the removal of such obstruction by bronchoscopy gave a much more reliable estimate of the extent of the growth.

SECTION OF ORTHOPAEDICS

Wednesday, July 26

Painful Shoulder

With Dr. ALEXANDER MITCHELL (Aberdeen) in the chair, Dr. PHILIP DUNCAN WILSON (New York) gave an analysis of 168 cases of painful shoulder. In the largest group the pain was due to lesions of the subacromial bursa. Discussing the anatomy and function of the subacromial bursa, he laid particular stress on the fibro-tendinous cuff formed by the combined tendons of the external rotators, which cuff was particularly liable to stress and strain. The more common lesions of the subacromial bursa were (1) calcareous deposits and (2) periarticular adhesions. He pointed out the difficulty of determining the part played by calcareous deposits in causing shoulder pain. He had had the opportunity of observing the actual conditions present at operation in several acute cases; when the deposit lay deep in the tendinous structure it caused no symptoms, but when it enlarged sufficiently to approach the nervous and vascular layer beneath the bursal wall the acute stage with pain was reached. Formerly treatment for such conditions was by rest and physiotherapy or by surgical excision. He had achieved good results with aspiration and irrigation by means of a needle. It might be necessary to guide the needle under *x* rays, since relief of the pain depended on reaching the deposit with the needle. Relief in cases of acute pain was immediate and generally permanent. Cases in which the deposit was dense and almost bone-like, however, did not respond to this treatment, and operation had to be undertaken.

Dr. Wilson then described the common symptoms of periarticular adhesions, and stated that, in his opinion, the adhesions lay in the substance of the tendino-capsular structure. As to whether this tendinitis was a true inflammatory process due to some low-grade infection or to degenerative changes was not clear, but in his experience most of these patients recovered without any particular attention being paid to septic foci. In treating such cases of primary tendinitis heat, massage, and pendulum exercises were advocated. If the pain was severe at night the arm was immobilized, and if no improvement had been noted in two weeks some other procedure, such as manipulation under anaesthesia or treatment by traction and a suspension apparatus, should be adopted. Dr. Wilson finally pointed out that there was a group of cases in which periarticular adhesions were secondary to injury of the soft structures. Such cases responded well to local physiotherapy—in contrast to the primary group.

Mr. V. H. ELLIS confined his remarks to injury to the supraspinatus tendon. He discussed the symptomatology, and expressed the opinion that the pain in these cases had its origin in the muscle or its tendon. The muscle might be contused, or completely or incompletely ruptured. It was difficult to differentiate clinically between complete and incomplete rupture. In cases of incomplete rupture recovery was spontaneous, but could be expedited by early passive movements; in cases of complete rupture early operation was imperative, and even then the results might be disappointing. Mr. B. L. MCFARLAND (Liverpool) gave a very useful clinical classification of painful shoulders, dividing them broadly into two groups—those with no limitation and those with limitation of movement. Under the second heading the most common cause was probably adhesions. When the adhesions were of the type that snapped the patients did well with active treatment. If the adhesions were of the type that tore, the patient should be treated in an abduction splint.

Mr. H. O. CLARKE (Manchester) confirmed Dr. Wilson's opinion as to the success of aspiration and irrigation in cases of calcifying tendinitis, and referred to the association of periarticular adhesions with acute illnesses. Saying that he never had been able to diagnose a case of rupture of the supraspinatus tendon, he asked for advice on arthrography. Dr. G. SLOT stressed the importance of the sympathetic factor; he had achieved success with the Leriche method of injection of large quantities of novocain followed by physiotherapy. Dr. J. A. MCVICKER (Belfast) said that in chronic cases the diet should be regulated before any specific treatment to the joint was begun. He advocated progressive manipulation, and he also endorsed the importance of the sympathetic factor. Dr. H. POSTON (Manchester) mentioned the association of painful shoulders with septic foci. He thought that the adhesions which snapped were probably intra-articular, while the adhesions which tore were extra-articular.

In replying, Dr. WILSON attributed the poor results of operation in ruptures of the supraspinatus to too long an interval elapsing between the tear and the operation. He himself would not undertake suture after three months. He mentioned the danger of manipulation because of the risk of tearing live structures. Mr. ELLIS said that another factor affecting the results of operation in cases of rupture of the supraspinatus tendon was the condition of the tendon. He thought that in cases of calcareous deposit needling without aspiration gave relief if the deposit was under tension.

COMBINED SECTIONS OF DISEASES OF CHILDREN AND MEDICAL SOCIOLOGY

Wednesday, July 26

Nutrition of Mother and Child

With Professor G. B. FLEMING, President of the Section of Diseases of Children, in the chair, Sir JOHN BOYD ORR (Aberdeen) opened a discussion on problems of the nutrition of mother and child.

Sir John said that since the beginning of the present century there had been a remarkable improvement in the national dietary, with a corresponding improvement in national health and physique. There was still, however, a great amount of preventable ill-health and poor physique, especially among the poorer classes, in which the infant mortality rate and the incidence of disease due to faulty diet were higher than among the well-to-do. The results obtained in an experiment with recruits rejected on medical grounds showed that they could be reconditioned. In one of the first experiments done in 1937 64 per cent. were fit for service after six weeks' treatment, and 18 per cent. were almost fit for service. These recruits were put on a first-class diet, and, although other hygienic factors would favour reconditioning, the results of feeding experiments in

which other factors remained constant, such as those carried out in Scotland on school children, suggested that the improvement of the diet was the most important item. The public health measures, especially the providing of milk and other health foods free or at reduced rates at child welfare clinics and maternity centres, which had increased so largely since the war, had been an important factor in reducing the infant mortality rate in England and Wales from 138 in 1901–5 to 58 in 1937. Recent work emphasized the importance of proper nutrition in the early years of life, including the pre-natal period. If a healthy race was to be built up they must intensify the work done to improve the nutrition of the expectant and nursing mother and the infant and pre-school child. The report of the Nutrition Committee of the British Medical Association, which set up a minimum standard of diet, was an important advance. A further advance was made by the League of Nations Committee, which concentrated its attention upon the mother and child. Unfortunately the kind of diet recommended, which included one litre of milk, one egg, green vegetables, and fresh fruit daily, was beyond the purchasing power of many working-class families. The time was ripe for a large-scale test of improving the diet of expectant mothers. A test with two or three thousand women in a district or a city where the infant mortality rate was high would give an indication of the extent to which maternal and infant mortality rates could be reduced, disease of children decreased, and the physique of the next generation improved by application of the results of research on nutrition.

Professor J. C. DRUMMOND, referring to the large-scale test on expectant mothers, explained that this was already in progress, and a group of mothers were receiving extra minerals and vitamins during pregnancy. In one respect, he continued, the modern tendency to push up the optimum amounts of vitamins required by healthy people presented an exception—namely, as regards vitamin D, for which the experts now actually recommended less than a few years ago. Historically considered, it appeared impossible that the huge doses of vitamin D which had been advocated—for example, during pregnancy—could have been obtained in the past from natural foods, and hence it appeared necessary to consider if the presentation in the diet of calcium and phosphorus in correct amounts and proportions affected the amount of vitamin D required. This led to a consideration of the anti-rachitic value of human milk. It was found that the vitamin D content of human milk varied, not with season but definitely with the amount of vitamin D in the maternal diet. On the other hand, the calcium content of human milk appeared to be largely uninfluenced by the maternal diet. It was disturbing to note that the calcium intake of the infant fed with human milk was often insufficient to provide the amount calculated as requisite. There were still unexplained factors in the whole question of the utilization of calcium from human milk, and there was need for metabolic studies on infants fed by mothers whose diet conformed to optimum standards such as those advocated by the League of Nations Committee on Nutrition.

Professor NOAH MORRIS (Glasgow) dealt particularly with problems of calcium metabolism, mentioning first the general functions of calcium and the factors which regulated the retention of this substance in the body. He thought that one of the great dangers of artificial feeding of infants was over-dilution of milk, since there was a modern tendency to give concentrates of vitamins and at the same time to starve the infant. The speaker pointed out in this connexion that boiling milk, necessary on grounds of safety, actually promoted a better retention of calcium and phosphorus. As regards the intake of calcium during pregnancy, it was easy to calculate this as being in the neighbourhood of 1.6 grammes daily. There was possibly some danger of over-emphasizing the disappearance of florid rickets, for he had found that among 500 admissions to a children's ward combined clinical, radiological, and biochemical studies revealed rickets in nearly 50 per cent. Further, there was evidence that a large number of the convulsions met with among children in the first year of life were due to hypocalcaemia. At the same time it was wise not to attribute all the defects of growth to lack of calcium, since there were other factors which played a part in the ossification of the skeleton.

Dr. H. E. MAGEE described experiments concerned with the phosphatase content of the blood in connexion with pre-symptomatic indications of defects in calcium and phosphorus metabolism. A series of experiments with sheep on a deficient diet showed that a rise in blood phosphatase occurred at least one month before experts could detect that there was anything wrong with the sheep. It could be taken that a rise of the blood phosphatase above normal was a warning that something was about to go wrong unless conditions of diet were altered. These observations had been applied to examination of pregnant women, and in one investigation at Blackburn it appeared that there was statistical proof of a correlation between the level of the phosphatase of the blood and disturbances of health during pregnancy, labour, or the puerperium.

Dr. J. C. SPENCE (Newcastle-upon-Tyne) emphasized the great improvement in the nutrition of children viewed over the past twenty years, stressing the disappearance of florid rickets and certain skin lesions associated with vitamin deficiency, as well as the decrease in the infant mortality rate and absence of xerophthalmia. Despite these facts, however, economic and sociological studies suggested that all was not well, and there was need for the collection of detailed information of the dietetic faults still present in the community. Dr. Spence suggested that rickets, for example, might be made a notifiable disease so that investigation of the factors leading to its occurrence in individual cases might be carefully studied. The main problems at the present day could be grouped under the headings of economic, ignorance, and incompetence. Dealing with the question of ignorance, he quoted a "case" shown to a medical society of a mother of seventeen children, fourteen of whom were living, brought up on an average wage of £1 to 30s. per week, and all healthy specimens with good teeth. The results had been achieved by excellent mothercraft and homecraft, and Dr. Spence urged that such examples needed far more publicity. [Later in the discussion, as the result of questions, Dr. Spence explained that careful buying in the markets of "waste" being sold cheap and the use of the stockpot to provide soup daily were among the methods used by his "case."]

Dr. GRACE CUTHBERT (New South Wales) said that recent visits to Holland led her to contrast the state of affairs in Scotland with those in Holland and in New South Wales. She thought that there was insufficient application of the available services in Scotland, and that in general medical officers of the welfare centres were not sufficiently keen on breast-feeding. Better instruction in mothercraft was essential, and could be done through nurses trained in this science. Dr. ELENORA SIMPSON (St. Andrews) pointed out that every woman who had a baby was inundated with advertisements of artificial foods for infants, and she was thus tempted to abandon breast-feeding at the first sign of difficulty. Owing to these commercial interests breast-feeding suffered, and yet, as continuous observations of children at the James Mackenzie Institute in St. Andrews showed, there was great superiority of the breast-fed infant as compared with the artificially fed. Dr. W. G. WICKREMESINGHE (Ceylon) pointed out that in Ceylon the soil was deficient in calcium, and hence the diet was very likely to be deficient in this mineral. About two-thirds of all infant deaths in Ceylon were due to convulsions, and presumably this meant a serious degree of calcium deficiency. Dr. W. G. BOOTH (Boston) expressed his satisfaction that the discussion was concerned with the nutrition of normal people, and he pointed out how eager public health authorities were to co-operate in the matter of improving nutrition. He thought that the notification of rickets, as had been suggested, was not without its dangers. Mr. GRIFFITH EVANS (Carnarvon) spoke of the great need for propaganda, and insisted that every possible opportunity should be taken to instruct mothers about correct diet. Dr. H. V. P. CONRICK (New South Wales) thought that the selection of food and how to cook it should be made a compulsory subject in the schools so that every girl received expert instruction. Dr. I. LEITCH (Aberdeen) dealt with some of the difficulties relating to calcium supplies in human milk. Cow's milk certainly contained more calcium than human milk, but there was a danger in so-called "humanized" milk mixtures in diluting this calcium to low levels. In the breast-fed infant the total intake

of calcium might be low despite an adequate concentration of calcium in the milk, merely because the total milk supply was inadequate. Medical practitioners, stated Dr. Leitch, took far less trouble over preparing women for lactation than the laboratory worker took over preparing rats, for example, for lactation. If the calcium drain of lactation was to be dealt with properly it meant adequate diet during pregnancy so that stores might be laid down.

SECTION OF PHYSIOLOGY AND BIOCHEMISTRY

Wednesday, July 26

Control of Respiration

With Professor G. SPENCER MELVIN, Vice-President, in the chair, the session began with a discussion devoted to the control of respiration, the opening paper being given by Sir JOSEPH BARCROFT (Cambridge). He took for his special subject the intra-uterine development of respiratory effort. In his own experiments upon the sheep's foetus he had been able to follow this development stage by stage, starting from a simple response to stimulation of the trigeminal nerve, which in the next stage became a rhythm. The rhythmic responses were of two types—one a movement like "an effort to get up," and the other an after-rhythm simulating respiration. Later these movements were subjected to an inhibition, which transections of the central nervous system had shown to be established in a centre in the thalamic region. Until this stage was reached respiratory movement could not be initiated by asphyxia. One effect of asphyxia, therefore, was to release respiratory movement from the thalamic inhibition. At birth a battle was waged between inhibition and sensory stimulation, the former being depressed by asphyxia. Professor Barcroft then went on to show a film which fully illustrated all his main points.

The President, Professor E. D. ADRIAN (Cambridge), pointed out that Sir Joseph had devised a new and illuminating approach to the problem of respiration which was particularly interesting to the neurologist, since it showed some of the fundamental properties of the central nervous system. Work on the electrical reactions of the brain had shown the importance of afferent impulses in raising the general level of activity, and had given some insight into the first important factor in the control and development of respiration—namely, the general facilitating effect of afferent impulses. The rhythmic movements of respiration had to be integrated with the other needs of the body for speech, movement, etc., and this integration was brought about by the second nervous factor—the sense organs in the lung which sent fibres up the vagus. The third nervous factor was that of the glomus caroticum endings, recently investigated by Professor Heymans; these signalled the state of the blood to the respiratory centre. All three factors might conceivably come into operation in certain pathological states. In particular the vagal endings, if exposed to irritants, might be the cause of rapid breathing. So far disturbances of the carotid sinus endings had not been reported, but we were still far from knowing fully their normal effect.

A further contribution to the discussion was made in the course of a paper by Professor W. H. WILSON (Cairo), who described the control of respiration as a visceral function, and the control of breathing as somatic function. The first was governed by centres in the midbrain and medulla, the second by influences from the cortex and from the thalamic region passing through the hypothalamus to the centres governing respiration. The second formed the occasional control of breathing by posture, body movements, and sensory stimuli. Apart from central chemical stimuli, the control of respiration was affected by three reflex influences: (1) chemical, through the carotid sinus and aortic areas; (2) reflex periodic inhibitory influences from the lungs; and (3) tonic accelerator influences from the lungs. Anrep had given two new proofs of the latter. If one lung was ventilated with the vagus cut, and the other was collapsed with the vagus intact after section of the branches to the aorta, "vagotomy breathing" only occurred after section of the vagus from the collapsed lung. The intravenous injection of ethyl aceto-acetate inhibited breathing by exciting the vagal endings in the lungs, but if the cervical vagus was cooled below 8° C., thus blocking the inhibitory fibres, the injection was followed by rapid breathing due to the excitation of respiratory accelerator vagal endings in the lungs.

Cardiac Muscle Metabolism

With the President in the chair, Professor E. W. H. CRUICKSHANK (Aberdeen) described experimental work which demonstrated a linear relation between the glycogen content of the heart and the level of the blood sugar in the male rat. The relation of lactic acid to blood sugar utilization was represented by a rectangular hyperbola. The sum of blood-sugar-lactic-acid utilizations was greater with higher concentrations of either. Lactic acid was probably not used by the rat's heart for glycogen synthesis. Further investigation of the functional relation between glucose and lactic acid would necessitate the use of a heart-lung preparation. Fat utilization in the mammalian heart could not be decided gravimetrically or by the respiratory quotient method. The question of the "reducibility" of the fatty acids in muscle and blood had to be investigated. It had been shown that neutral fats and fatty acids were reduced in aglycaemic conditions. The relative call upon carbohydrate and lipoid reserves during the reduction of the blood sugar to levels approaching 5 mg. per 100 c.cm. of blood could be approximately stated as: blood sugar 80 per cent., heart glycogen 65 per cent., blood and heart muscle fatty acids, each 20 per cent.

Dr. A. LYALL (Aberdeen) then raised a point about the form in which the fatty acids were used, and Dr. D. P. CUTHBERTSON (Glasgow) inquired whether protein was also utilized. In reply, Professor CRUICKSHANK said that he regarded the evidence upon both these matters as unsatisfactory.

Substitute Carbohydrates in Diabetes

The final paper by Dr. H. W. KOSTERLITZ (Aberdeen) was concerned with the metabolism of substitute carbohydrates, which substances he defined as compounds which were better tolerated by diabetic patients than was glucose; they reduced ketonaemia and ketonuria, and had a sparing effect on nitrogen metabolism. The best known of these substances were laevulose, dihydroxyacetone, sorbitol, and galactose. In the depancreatized dog, laevulose and sorbitol could lead to the deposition of appreciable quantities of glycogen, which was not the case with glucose. This phenomenon might be due to the intermediary formation of some substance readily built up into glycogen. In the case of galactose an intermediary product—galactose-1-phosphoric acid—accumulated in the liver during assimilation, and it was probable that this was only slowly transformed into glucose. Since initial phosphorylation appeared to be essential for galactose metabolism, the rate of this reaction would determine the tolerance for this sugar. It was of interest that galactose-1-phosphoric acid was also an intermediary product in galactose fermentation by galactose-adapted yeast. In this process, however, there was no accumulation of the ester, since dried yeast fermented glucose and galactose-1-phosphoric acid at approximately equal rates.

Arising out of Dr. Kosterlitz's paper questions were put by Dr. J. N. DAVIDSON (Dundee) as to the site of conversion of galactose, and Dr. D. P. CUTHBERTSON (Glasgow) asked what would be the effect of galactose on an animal rendered diabetic by anterior pituitary hormone.

On July 26 the new fracture clinic at the Hull Royal Infirmary, which has cost £10,000, was opened by Mrs. Arnold Reckitt. In commemoration of Mr. Joseph Rank's continued benevolence a ward at the Sutton branch hospital has been named after him. A gift of £60,000 was recently made by Mr. Rank to the general endowment fund of the Royal Infirmary.

Correspondence

Memorial to Sir Robert Bolam

SIR,—For a considerable time before his death many friends and colleagues of Sir Robert Bolam in the University of Durham and in the hospitals associated with King's College had been considering the desirability of making a presentation to him in the form of a portrait. There is now a widespread feeling that such a project should be proceeded with as a memorial to him.

As is well known, Sir Robert, in addition to his recent activities with the new buildings of the medical school, had a very long association with the former College of Medicine and with the Royal Victoria Infirmary. He served both of these institutions in various capacities. In the College of Medicine he was in turn lecturer on physiology and pathology, joint lecturer on physiological physics and chemistry, professor of medical jurisprudence, subcurator of the Museum; while in the Infirmary he was assistant physician and pathologist, later becoming the first honorary physician in charge of the skin department, and held this post until his retirement from the Infirmary staff in 1931, when he was appointed honorary consulting physician to the skin department. The accompanying lectureship in dermatology in the College of Medicine he held from 1914 to 1937. He also served with distinction as the University of Durham representative on the General Medical Council and was well known for his activities on other bodies, notably the British Medical Association, of which he was for some time Chairman of Council. In recent years he devoted much of his time to the administration of the College of Medicine and with the general work of the University, acting as registrar to the College and later as president and chairman of council; he was also in 1936–7 vice-chancellor of the University.

Since the reconstitution of the University Sir Robert's main energies were devoted to the erection of the new buildings for the medical school, and as chairman of the Building Board he was able to see the completion of that task. It seems fitting that as the last president of the College of Medicine and as one who devoted so many years to the interests of medical education, his name should be perpetuated by a suitable memorial. It is proposed therefore to raise a fund to be devoted to the following purposes: (1) A portrait in oils. (2) A memorial tablet to be placed in a suitable position in the medical school. (3) To augment an existing fund the interest on which is to be applied as a prize in dermatology.—We are, etc.,

LONDONDERRY.
J. F. DUFF.
EUSTACE PERCY.
ARTHUR M. SUTHERLAND.
JOSEPH REID.
RALPH MORTIMER.
R. J. WILLAN.
F. C. PYBUS.
R. B. GREEN.

The Medical School, King's College, Newcastle-upon-Tyne.

Immunization against Diphtheria

SIR,—It is gratifying to learn, even if coming tardily, of the British Medical Association's unanimous decision to launch a campaign for the public acceptance of immunization.

In March, 1924, a member of the London County Council put forward a request for a report as to whether or not the treatment carried out by the Department of Health in New York City for rendering children immune from diphtheria should be adopted in the London schools. A full report on the subject was supplied to the Public Health and Education Committees, which, wisely or not at the time, decided against the adoption of immunization in the London schools, maintaining that such measures for safeguarding child life were more properly the function of the individual metropolitan boroughs. Subsequently sanction was given for the circulation in the schools of leaflets issued by the boroughs on the subject of diphtheria prevention, for distribution to the parents of school children. With the passing of the Local Government Act of 1929, by which the Poor Law guardians' residential schools came under the Council's authority, it was decided to introduce immunization in those schools among the children whose parents or guardians consented. Since then this routine preventive measure has met with pronounced success in ridding the residential schools of the menace of diphtheria.

As regards action by the metropolitan boroughs, for a number of years facilities have now been afforded by nearly all the twenty-nine boroughs at the various clinics and welfare centres throughout the metropolis, and in Greater London as well, for parents who wish to secure the protection of their children against diphtheria. Although coming at so long an interval after the original pioneer preventive work was started, it is fitting that the campaign now advocated should have emanated from Aberdeen, where the earliest efforts to immunize the child population were set on foot in 1922 by the late Dr. Matthew Hay and Dr. Parlane Kinloch, and in Aberdeen County by the late Dr. J. P. Watt of Fraserburgh in 1924. Since then, during the past fifteen years, the adoption of immunization has become widely developed in most of the populous centres throughout the British Isles. Full details were published in my article in your issue of December 18, 1937 (p. 1209).

Despite the increase in the preventive work in this country it was clearly shown that in comparison with similar measures on a much more extensive scale in the United States—notably in New York City—and in Canada, especially at Montreal as well as in Hamilton (Ontario), quite insufficient numbers of children in Great Britain and Ireland had been protected to allow of any effect being produced on the general incidence and mortality of diphtheria. Although protection has been afforded to numbers of individuals, their proportion to the non-immunized falls very far short of the 60 per cent. of the total child population needing protection before the results could become apparent in the lowered diphtheria rates; whereas in the United States and Canada, on the other hand, in the centres concerned, the decline in diphtheria cases and deaths has been so pronounced as to leave no doubt whatever that this has occurred as the direct result of immunization—and, be it said, without any compulsory measure having been enacted. Compulsory legislation, as a means of securing the forced adoption of immunization, although employed as a military measure in France and recently applied in Guernsey, would be deprecated in this country, and fail of success in gaining public acceptance and co-operation. It is evident that the campaign now pleaded for at Aberdeen should be directed to a much wider extension of immunization measures than heretofore, and demands the fullest publicity. Moreover, as was stressed at the Meeting in Aberdeen, the call for present action comes at a time when, under threat of war, preparations are being made for evacuation of thousands of children, the vast majority quite unprotected against the certain risk of spread of diphtheria infection, under conditions of unusual mass contact in the course of transport.

It needs to be made clear that the preventive means at our disposal are not now receiving publicity for the first time, but the public memory is short and in need of constant reminding by continuous well-regulated official propaganda and action, which should not be dependent on haphazard individual effort. Lest, however, others should remind us of the facts, it has to be remembered that serious setbacks to the progress of the preventive work have had to be faced from time to time in past years, as the result of human error, productive even of fatal effects, in every case attributable not to any fault in the proper prophylactic itself or its preparation but to a mishap of inoculation, either by careless use

of wrong material or by faulty technique allowing introduction of septic infection. It is but right to point out that no such accident has been proved in this country, and to emphasize that the process of immunization is one which can be guaranteed as not only thoroughly safe and harmless but reliable in providing protection against diphtheria in the vast majority of those inoculated. Furthermore, its application to young children at the earliest age, preferably during or soon after the first year of life, is to be urged, in order to ensure freedom from attack at the most susceptible period before reaching school age, and thus to secure the necessary protection during inevitable exposure to infection in school years.

It is much to be hoped that the campaign now envisaged at Aberdeen may meet with the same unanimity throughout the medical profession at large and among the general population, and so result in a response which may lead to a great reduction in the incidence of some 60,000 cases, and in the 2,000 to 3,000 deaths from diphtheria recorded year by year in this country. To ensure success to the campaign it is imperative that under the all-important active lead and guidance of the Ministry of Health all local authorities should give their whole-hearted support in pressing forward and bringing to public notice facilities for providing immunization wherever diphtheria threatens. —I am, etc.,

Wadhurst, July 30. J. GRAHAM FORBES.

Sulphonamide in the Air

SIR,—The occurrence of symptoms of poisoning in an aircraft pilot following the use of a drug of the sulphonamide group as reported by Colonel F. P. Mackie (*Journal*, July 15, p. 139) is of interest to all who have flying personnel under their medical care. Similar cases have been reported from America and Germany. Unpleasant symptoms may occur quite apart from any coincident anoxaemia, and the warning therefore applies to drivers of vehicles of any sort and to others working in dangerous occupations.

It is now nearly two years since Dr. V. E. Lloyd, in a personal communication, reported the occurrence of symptoms of drug intolerance from sulphanilamide (prontosil album) in lorry drivers, which sometimes grossly affected their judgment of speed and distance. Instructions were immediately issued to all Royal Air Force medical officers that no officer or airman should be allowed to fly or to drive motor vehicles while taking these drugs. No case of poisoning by the sulphonamide group of drugs has been reported officially among R.A.F. personnel while on duty.—I am, etc.,

Central Medical Establishment, Royal Air Force, Kingsway, W.C., July 26. A. F. ROOK.

Rubiazol in Nose and Throat Conditions

SIR,—In the medical literature during the past two years there have been cases recorded of the dangers attending the use of sulphanilamide drugs. It may be of interest to readers briefly to summarize my own experiences. I have always felt averse to the present tendency of the liberal use of sulphanilamide in early streptococcal pharyngeal conditions, which form the great proportion of streptococcal ills, especially after I had experienced and observed in patients some of the unpleasant side reactions.

During the past year I have used one of these carboxy derivatives (rubiazol) extensively and exclusively. The age of the patients has varied from 1 year upwards, and the number of patients treated has exceeded 300; during the whole of this time I have never observed the slightest ill effects. The group of cases treated fall under one wide heading of acute streptococcal inflammation of the nasal or pharyngeal mucosa, a group which covers streptococcal tonsillitis, sinusitis, pharyngitis, and laryngitis: in brief, the mucosal area which is dealt with by the ear, nose, and throat surgeon.

I wish to make it clear that this medical treatment has not been used or even considered when there has been the slightest evidence of pus formation. It must be obvious, when this has occurred, that the only procedure is surgical drainage. During the treatment of the infection there has been no restriction in any way of the patient's diet, nor has there been any need to forbid the use of magnesium sulphate. In cases which were seen at the onset rubiazol was given before the temperature had risen, two tablets four times a day until twenty tablets had been taken. All cases responded rapidly to the treatment, and the sore throat was successfully aborted. In the number of cases in which the patient had a temperature of 100° to 102° F. when first seen the temperature remained up on an average fourteen hours, and then came down by crisis. It was necessary to continue the carboxy-sulphanilamide for at least three days after the temperature had fallen, giving two tablets four times a day to prevent a recurrence (children's dosage in proportion, according to age). I have come to the conclusion that the carboxy addition to the sulphanilamide grouping gives all the clinical results in streptococcal pharyngeal infections of ordinary sulphanilamide, but without its dangers.—I am, etc.,

London, W.1, July 24. EDWARD CAREW-SHAW, F.R.C.S.

Price of Sulphonamides

SIR,—In the House of Commons on July 20 Dr. Summerskill raised a point that should concern the whole of the medical profession as well as the Government.

It appears to be possible under the present law for a private company to take out a patent or monopoly of a new drug and to sell it at whatever price they wish. This was done with some of the sulphonamide preparations.

No medical man who has any acquaintance with these substances can doubt that they have the power to save much suffering and often life itself. It is therefore of the greatest importance to see that such a drug should be available at the lowest possible price so that none shall be deprived of it through poverty.

In the case of drugs of less value the matter is not important, but with potent drugs for which there is no substitute the profits should be limited to a certain proportion of the cost price of manufacture, and not extended indefinitely to cover the cost of large research laboratories. —I am, etc.,

Cardiff, July 21. F. RAY BETTLEY, M.D.

Analgesia in Midwifery

SIR,—With reference to the discussion at Aberdeen on allowing midwives to administer gas-and-air anaesthesia to women in labour and the outcry in the lay press because this proposal was vetoed by the representatives, it seems to me advisable to call attention to the fact that there are safe analgesics which are in some cases able to relieve the pains of delivery as well as gas-and-air anaesthesia. The best of these is a combination of morphine and hyoscine. Quite recently I attended the delivery of a woman suffering from acute laryngeal diphtheria, contraindicating any form of inhalation anaesthesia. An injection consisting of morphine, grain 1/4, with hyoscine, grain 1/100, produced perfect "twilight sleep," which allowed delivery of twins without any discomfort—one a vertex, the other a breech. The patient was in an ideal condition of amnesia, and the twins were both born alive.—I am, etc.,

Bournemouth, July 25. S. GORDON LUKER.

Pelvic Disproportion

SIR,—In reply to Dr. J. A. J. Hammond's pertinent questions (July 15, p. 143), I would like to say that puncture of the membranes is incomparably the most reliable method of inducing labour for the purpose of avoiding disproportion. Induction of labour must be effected before there is actual bony disproportion. The vast majority of women submitted to Caesarean section have diameters between three and a half and four inches. Thus there are very few in which a more plastic foetal head was not easily compatible with the maternal pelvis at some time in the last four weeks of pregnancy. Professor Munro Kerr's attitude (June 24, p. 1303) is to me inexplicable. It completely overlooks the fact that the mortality among children born three or four weeks prematurely is little different from that at full term, and the foetal head increases in diameter by at least one-quarter of an inch in the last four weeks of pregnancy. He disparages Professor Hauch's results, with a foetal mortality of 5 per cent. It is interesting to compare this figure with some others of the present day. From five reports of maternity hospitals just published I find sixty primigravidae submitted to Caesarean section at or after term, mostly after spontaneous labour had started and a trial failed, many having been measured and tested by Munro Kerr's method and having received ante-natal supervision in the institutions; the results show in these sixty cases: maternal mortality four; foetal mortality ten. In the same hospitals there was not a maternal death among the cases induced on account of disproportion, and there were four foetal deaths (none of these were cases in which rupture of the membranes was the method adopted for induction).

In 1923 I defined the clinical observations to be made during a trial of labour in doubtful cases and advocated giving the natural forces an unharassed opportunity of showing their efficiency one to four weeks before term, when there are compatible proportions, and applied the principle equally to primiparae and multiparae. At first the chief difficulty was to find a satisfactory method of induction; bougies were difficult to prepare, and after several years' trial I advocated the use of the stomach tube. Both showed unreliability in action. In 1931, at the Congress of Obstetrics and Gynaecology, I read a paper advocating puncture of the membranes and its readoption, as it is closely allied to the methods of nature.

The bogy of "dry labour" is a myth. I found that 28 per cent. of so-called normal spontaneous labours were actually precipitated by the spontaneous rupture of the membranes. Since then Dr. Higgins of Woking published a paper on induction of labour in the *Journal* of October 19, 1935 (p. 721). He found in 27 per cent. of 150 cases of normal labour rupture of the membranes had occurred before admission, usually as the first sign of labour. Dr. A. G. King of Cincinnati (*Amer. J. Obstet. Gynec.*, 1936, **32**, 201) found 31 per cent., and in primiparae 35 per cent., of similar cases. Rupture of the membranes most commonly occurs one to two weeks before term. It is Nature's conservative treatment for potential disproportion.

There is no increased risk in Caesarean section with the membranes ruptured several days and after a properly controlled trial of labour up to the point of demonstrating the undesirability of pelvic delivery. In my series of sixty-five cases twenty-five were primiparae, and I had one foetal death (congenital heart abnormality). The longest latent period was sixty-three hours in a primipara with a seriously close fit. No other case exceeded forty-four hours, and not more than twelve exceeded twenty-four hours; the majority of cases had completed delivery within twenty-four hours. Two cases failed in the trial of labour, both primiparae: (1) Induced at thirty-seven weeks; latent period, eight hours; labour, twenty hours; Caesarean section—live infant, 6 lb. 6 oz., mother well. (2) Induction at thirty-eighth week; latent period, thirty hours; labour, thirty hours; Caesarean section—live infant, 7 lb. 5 oz., mother well. Higgins in 115 cases (sixty-eight for disproportion), with sixty-four primiparae, had one primipara and two multiparae with latent periods over forty-eight hours, and six and three respectively with twenty-four to forty-eight hours. His duration of labour was, in primiparae, eight over twenty-four hours and forty-four under eighteen hours; no multipara exceeded twenty-four hours. There was one maternal death from toxaemia, and five foetal deaths.

I do not for one moment decry cephalometry. Exact measurements would be of enormous value but are obtainable in only a fraction of the total cases. The clinical methods that have been devised have a sufficient margin of error either way to render the treatment indicated by them perfectly safe and applicable by anyone. In my textbook *Obstetrics*, published in 1937, I have dealt very extensively with this whole subject from the ante-natal, preventive, and operative aspects.—I am, etc.,

Dublin, July 18. GIBBON FITZGIBBON.

SIR,—In reply to Dr. J. A. J. Hammond's inquiry (July 15, p. 143) as to the reliability of rupture of membranes as a means of inducing labour, my experience in over 200 cases has been 100 per cent. successful. In the majority of cases labour has started in less than twelve hours; the longest delay was forty hours. I believe the technique of the rupture of membranes to be very important. It is not the escape of liquor which is mainly responsible for the onset of labour, and methods that depend on piercing the membranes with a small instrument are likely to fail. One often sees spontaneous leakage of large quantities of liquor with no labour resulting.

My own method is to introduce 1½ oz. of 10 per cent. dettol in glycerin into the vagina. Then the os is dilated with one finger until, if possible, two fingers can be passed in. A long pair of artery forceps is passed between the fingers and laid flat against the side of the head. Under protection of the fingers the blades are opened and then closed, pressing against the head. A fold of membranes is thus picked up and drawn taut. With a finger the membrane is torn through, and the finger swept round to make the opening as wide as possible. A small amount of liquor usually escapes, and no attempt is made to increase this quantity. The head acts as an effective plug, and only small amounts escape until delivery is effected. I believe it is the contact of the foetus with the uterine muscle which provides the stimulus.

In order to make certain of the onset of labour I have usually added a mild form of the quinine induction method: 5 grains of quinine hydrobromide are given overnight, and 5 grains four-hourly after rupture of the membranes so long as it gives rise to no discomfort. It is important, in cases of pendulous abdomen, that a tight binder be fitted to keep the head pressed into the os.

In a few cases the cord has been recognized lying below the head, and this was pushed up, aided by movements of the body, before the membranes were ruptured. Twice a hand was found below the head and was returned in the same way. Several cases of breech with extended legs were treated by induction when the biparietal diameter reached 3.65 in. Labour began as usual, and spontaneous delivery with the legs still extended followed easily. In a few cases in which the onset of labour was delayed for more than twenty-four hours one or two doses of 1 c.cm. pituitrin were given.

With regard to the rate of increase of the biparietal diameter, I have pointed out that this increase is almost exactly one-tenth of an inch a week during the last five weeks. The question of Caesarean section after induction should never arise. If induction is performed when the head is plastic and the diameters of the inlet

and outlet are appropriate delivery can always be effected. Only a long series of inductions will establish how small these diameters may be. I have not hitherto induced labour with a true conjugate of less than three and a half inches or an interischial diameter of less than three and three-quarter inches.—I am, etc.,

Bexhill-on-Sea, July 24. NORMAN REECE.

Forgotten Intravaginal Pads

SIR,—In reply to Dr. W. G. Burns (July 29, p. 250), I must say that after one or two experiences of the kind described, in my letter in your issue of July 15—which, to judge by letters and articles one has seen in the *Journal* from time to time, are by no means isolated instances—my first instinct if I were asked what I thought of intravaginal pads would be to advise against their use at all. But as I agree with him that women *will* use them when they find how comfortable they are to wear, I should probably content myself with stressing their more obvious dangers as strongly as I could. Actually, however, I have found it to be the exception rather than the rule for patients to consult me about menstrual wear, and I have wondered, therefore, if there ought not to be a notice in large print on every carton to say that it is *very dangerous* to leave these pads in the vagina for longer than the stated time?—I am, etc.,

Horton, nr. Swansea, July 31. VICTOR RUSSELL.

Foreign Bodies in Bladder in Attempted Abortion

SIR,—I was interested in the case recorded by Mr. A. H. Charles (July 29, p. 224), but I cannot think the occurrence is as rare as he suggests. Only last week I saw a patient, seven months pregnant, who was suffering from severe dysuria with a large stone in the bladder easily palpable per vaginam. Immediate inquiry was made as to the possibility of a foreign body having been introduced, but this was denied. By suprapubic cystotomy I removed the stone, which had as its nucleus a piece of slippery elm about two and half inches long.—I am, etc.,

Boundary Park Hospital, Oldham, July 30. A. H. BARBER.

The Abortion Report

SIR,—In reply to Dr. R. C. Webster in your issue of July 22 (p. 199), an estimate of the abortion rate in France by M. Eugène Humbert (given in Mr. David Glass's *The Struggle for Population*) is 800,000 a year, as compared with 700,000 live births. This high rate is exactly what would be expected in a country where the practice of birth control is illegal. The present position in that country, as in most others, is that while the vast majority of married couples are determined to space and limit their families, only a small minority can obtain medical advice for this purpose. In these circumstances it is not surprising that there is "a danger of serious repercussions" in more than one direction.—I am, etc.,

MARGARET PYKE,
Honorary Secretary, The Family Planning Association.

69, Eccleston Square, S.W.1, July 25.

Sea-sickness

SIR,—Colonel Blackham, in his synoptic article on sea-sickness (*Journal*, July 22, p. 163), touches but lightly on one line of approach which appears to me to go to the very core of the subject—the mental processes involved. My attention was first drawn to this aspect of the matter when, on one of the first of many passenger ships to which I have been surgeon, a duty of mine was to read the lessons at Sunday morning service. This entailed a seat on the platform, and so I faced the congregation. Then it was that I used to amuse myself by noticing how in the front row the ship's officers all swayed against the movement of the ship, side to side with a pause between from the movement resulting from a beam sea, a sort of figure-of-eight movement when the wind was on the quarter, and a slightly bibulous backwards and forwards swing when there was a head sea. It was amusing to see them all doing it together, quite unconscious of the fact, and more amusing still to watch them blend this basic rhythm of the ship with the metre of "For those in peril on the sea." When one came to think of it, it seemed obvious that these hardened mariners were so well versed in all the rhythms of the ship's motion that they could anticipate the next line, and so were never caught off their balance and were successful in keeping their stability in a heaving world. The essence of their success seemed to be that they knew the rhythm and therefore knew what was coming next.

But when one looked beyond the front row to the passengers' seats it was quite another story: there was no unison here. Some seasoned folk might sway a little, but rarely with the abandon of the officers; most of them stood awkwardly and apprehensively, unaware that they were being tossed to some glorious chorus, some elemental song of the sea; a few—and it was among these that I recognized my patients—clung, frightened, to chained chair or stanchion, not having the slightest idea what was going to happen and dreading it. They had not learnt the metre, did not know what was coming next, and therefore could not adjust their bodies to a new attitude in space.

Since those early days I have shown many people how to avoid or to get over sea-sickness, taught them to watch and listen and feel and thus learn the rhythm, to let it weave itself into their consciousness, let it be like a tune one hums interminably. A sustained mental effort is required at first, but it soon becomes almost automatic. Sometimes, especially in small ships, it helps to watch the sequence of the waves—it is like seeing the score of a tune. Sometimes in a confused sea it is hard to pick out a rhythm—like the worst jazz—but I have never yet seen a sea large parts of which could not be so resolved.

After all, this treatment is only speeding up the natural process of adaptation and cure which obtains not only on the sea but in every changing environment. The man in the train makes the noises and jolting sing songs to him, the efficient factory hand works to the rhythm of his machine, the rider trotting is doing a horsy elegiac in his head. It is all a question of blending with the rhythm, and until one can do that there is no harmony with one's surroundings.—I am, etc.,

Beckley, Sussex, July 24. C. G. LEAROYD.

SIR,—Colonel R. J. Blackham's exhaustive article on sea-sickness in the *Journal* of July 22 (p. 163) omits to mention "suggestion" as a help in mild attacks. In my experience it failed in severe forms, but I am not specially skilled in hypnosis. It would be interesting to know if it has proved successful in more expert hands; admittedly the skilled specialist and the *mise en scène* for his technique would rarely be available. I can recommend optrex eye masks as a great comfort, if nothing more, in the early stages, and, I think, a cure for "sea-sickness phobia." They can be applied in the deck chair as easily as in the

cabin, and are most soothing and cooling to the eyes and head. They will prevent the "visual sensation playing a part," and so diminish the liability to sickness. If accompanied by an effort to relax and an auto-suggestion of prevention they will ward off many an attack. The general effect is to calm the nerves, and if the sufferer, even though sickness has supervened, again applies the mask before going on shore the pathetic picture of the dazed Channel traveller struggling through the Customs is not so likely to be seen.—I am, etc.,

London, S.W.1, July 24. REDMOND ROCHE.

Gastric Findings in Dyspepsia

SIR,—I was interested to read Dr. S. Cochrane Shanks's letter in the *Journal* of July 29 (p. 248), in which he raises certain points about my recent gastroscopic study of dyspepsia (July 15, p. 108), and perhaps I may be allowed to reply briefly.

Dr. Shanks draws attention to the fact that of 147 patients with negative *x*-ray findings eight gastric ulcers had been missed in spite of modern and expert radiological technique: these were not shallow erosions but small chronic ulcers that did not differ from the ones detected by *x* rays and seen with the gastroscope. The radiological diagnosis of gastritis is too wide an issue to be dealt with here, and I would agree with Dr. Shanks that the chronic superficial variety gives no radiological signs. I cannot quite follow his question as to its hyperchlorhydric origin, but I do not regard it as being related to peptic ulceration. If there is a pre-ulcerous form of gastritis—and upon this point I have insufficient experience to say more than that many peptic ulcers are unassociated with gastroscopically recognizable gastritis—it is Schindler's hypertrophic variety: this may show characteristic *x*-ray appearances, but Schindler and Templeton (*Radiol.*, 1937 **27**, No. 4, 472) state that these were detected only three times in 450 cases. There is much evidence to suggest that the folds seen in mucosal-relief *x*-ray photographs do not correspond to those seen in gastroscopy. Perhaps I should say that I have not had personal opportunities of gastroscoping a series of cases studied by mucosal-relief methods, or by Berg's dosed compression technique.

With regard to Dr. Shanks's final remark about chronic appendicitis, I can only say, at the risk perhaps of appearing heretical, that in my own experience chronic appendicitis has been an infrequent explanation of dyspepsia of the type studied here, and often an incorrect one.—I am, etc.,

Birmingham, July 31. ERNEST BULMER.

Industrial Dermatitis

SIR,—It would be invaluable if some experts on skin disease would state what condition would satisfy them as being in the category of industrial dermatitis. For the last twenty years I have been medical officer of a factory here employing a large number of men, and the confusion existing over this complaint appears to be increasing. I admit that most of us, during our hospital training, never had as much study in the skin department as we should perhaps have liked, but to give a clerk in an office a certificate for "industrial dermatitis" when he has had eczema off and on since he was a baby seems to me to be straining the point a little. Any condition caused by an employee's work should be definitely, and in this factory always is, a compensation case.

The rash caused by paraffin, crude oil, and the preparation called, I believe, "mystic" can as a rule be easily diagnosed. It occurs practically always on the hands and arms, and, I should think, was about the only type of industrial dermatitis met with in factories, with the exception of chromic acid burns, which are quite typical. It would, however, be most instructive to know what other types there are and in what areas they occur.

At any rate, so long as any eczema, varicose or otherwise, can be certified as industrial dermatitis by the general practitioner a certain amount of hardship is going to be suffered by the factory employee in being led to think he has a definite claim for compensation, when, on further investigation by the insurance company, it is found that he is not entitled to such benefit, but must claim ordinary sickness benefit through his national health insurance.—I am, etc.,

Weybridge, July 21. GUY D. BARTON.

Treatment of Gonorrhoea in General Practice

SIR,—The letter by Dr. Robert Forgan (July 15, p. 138) focuses attention on a recent public health problem of considerable importance, and, as one who is in daily contact with this problem, I desire to record my appreciation of the lead given by Dr. H. P. Newsholme, medical officer of health for Birmingham, and also of Dr. Forgan's action in giving it wider publicity. The need for thorough tests of cure and adequate clinical observation in cases of gonorrhoea has always been of importance, but the rapid abatement of the signs and symptoms achieved in this disease by modern chemotherapy has made these measures more than ever necessary. It is difficult to see how these tests can be carried out by the practitioner himself, and it is equally difficult to believe that a patient who has attended a private doctor for treatment of about ten days' duration will be persuaded to attend at a V.D. clinic during the much longer period required for the assessment of complete cure. Dr. Forgan has also drawn attention to a lack of appreciation of the dosage of these drugs required to achieve the best results in gonorrhoea. The importance of a sufficient dosage, administered at proper intervals throughout an adequate period, cannot be overemphasized. I should like, in addition, to stress the need for making a definite microscopical diagnosis before instituting chemotherapy, as it is usually impossible to find gonococci in smears after the patient has received even as little as 2 or 3 grammes of the sulphonamide preparation. It may appear unnecessary to emphasize this elementary principle, but recent experience of cases referred by some practitioners to the V.D. clinic after tentative attempts at chemotherapy indicates that it is more often honoured in the breach than in the observance.—I am, etc.,

Stoke-on-Trent, July 22. S. M. LAIRD.

Group Tests in Blood Transfusion

SIR,—If war comes every individual in the country is a potential candidate for either transfusion as a casualty or service as a blood donor. I suggest, therefore, that every individual, as much for his or her own protection against death from haemorrhage as from the more altruistic motive of service, should have a blood group test, and the group number should be tattooed on the right upper abdominal quadrant. The advantages are obvious in the time that will be saved in what may be a life-saving procedure. The surgeon in a casualty clearing station unit would know immediately the blood groups of unconscious patients brought in, and a suitable donor would more easily be obtained. I would go further and

suggest that with modern apparatus and technique a blood transfusion could be aseptically given in an improvised dressing station or in the cellar of a bombed house. Cards and marked clothing are easily lost; this priceless information should be proof against loss and immediately available.—I am, etc.,

Bradford, July 25. A. HAYES SMITH.

Lay Psychotherapy

SIR,—The letter on this subject from Dr. E. B. Strauss and his brother officials of the International General Medical Society for Psychotherapy (*Journal*, July 15, p. 139) is an admirable effort. It is a frank attempt to protect the social and economic interests of medical psychotherapists. It is refreshingly free from rationalization and unpolluted by the hypocrisy of spurious idealistic motives. It exudes an atmosphere of robust trade unionism. As a medical psychotherapist I cannot be too grateful to Drs. Strauss, Crichton-Miller, and Hargreaves for their attempt to protect my pocket.

Imitating this manly vein of forthright and alarming honesty I cannot say that the conservation of my exchequer is a matter of little moment. It is possible, however, that even an affair of such paramount concern to myself and to the sturdy protectors of my interests is of less importance to society in general than the maintenance of scientific standards in psychiatry. An individual psyche is an interacting mechanism of body and mind. In the language of hymnology it is co-equal and eternal. Admittedly the writers of the letter realize the necessity for assessing the "importance of physical factors which so frequently intervene," but this would better be described as the diversion of attention to what is eternally present. One does not postulate the existence of tangible organic lesions in all psychiatric conditions. Far be it from a medical psychotherapist, craving and apparently receiving adequate protection, to lend any support to the school which considers that the amelioration of all psychological symptoms follows inevitably on the extirpation of all the viscera. But it is becoming more clear every day that there is a biochemical and glandular *milieu* determining the form of psychoneurotic symptoms. How can these factors be adequately assessed by a lay psychiatrist?

Diphtheria, tuberculosis, etc., are traceable to the activity of specific organisms, but mankind is not universally stricken with these plagues. While the influence of adverse psychological factors in causing psychoneuroses and, to a lesser degree, psychoses is adequately proved, all individuals exposed to such malign influences do not develop psychological symptoms. It seems that the appearance of these latter in those exposed to the infection of adverse environmental conditions depends to a large extent on biochemical and metabolic dyscrasia and vegetative imbalance. Lay therapists dealing with such conditions would be acting without the adequate therapeutic armoury. Surely the activity of even qualified psycho-analysts is very often, despite the fine ubiquitous nomenclature of that technique, extraordinarily parochial in its aim. There is something fundamentally irrational in the attitude of mind which spends six years qualifying and a further year or two in house appointments in the interests of that dubious exaltation which enables them to say, "Thank God, that's over. Satiated by the study of bodily sickness, we can now turn our thoughts to higher things." The fanaticism of the lay therapist would probably be even more extreme, considering his position on the wrong side of the fence. Such an approach one might expect in an Eastern mystic or an Indian fakir. This analogy is not a good one, for at least in the mysticism of the East there is held the hope of the control of vegetative nervous activity, so important in the psychoneuroses, where so often the symptoms presented are visceral echoes of emotional states employing the "stutter" of the vegetative nervous system for their continuance.

It seems pathetic and reactionary that we should consider a liaison with lay psychiatrists in these days of the Gestalt approach, when the importance of diathesis and personality peculiarities in such overtly physical states as, say, rheumatism is being more recognized. The researches of Pasteur deferred the advance of medicine by several decades in diverting attention from reacting man to causative agent. It would be tragic if, in the interests of a spurious tolerance, we deliberately condoned, in offering to work in tether with lay psychotherapists, what can only be a promiscuous and decadent union. The argument against lay psychotherapists is the same as that against the lay osteopath. He may do good. He may achieve striking cures. But in virtue of his lack of knowledge of the physiology and pathology of the whole individual he may do incalculable harm, and, at the least, must waste innumerable opportunities of doing good.

I hope most sincerely that Drs. Strauss, Crichton-Miller, and Hargreaves will do their utmost to see that we do not extinguish the dim little candle of scientific psychiatry to achieve the poor guerdon of a thoughtless chivalry. As the art of life is so manifestly the enduring of the second best, might I suggest that, if this unholy wedlock is consummated, a division of labour according to the principles laid down by Solomon be decided upon. In this bureaucratic age finite lines of demarcation will be insisted on. I suggest, therefore, that the mind be dissected from the body, preferably by the surgeon in order that nobody be excluded, and that the extirpated portion be handed to the lay therapist, that the remainder be relegated to the pathologists, and that we psychiatrists might devote our attention to the undissected few and achieve our proper destiny as ordinary and careful doctors.—I am, etc.,

Bath, July 24. ARTHUR GUIRDHAM, D.M.

Insulin Syringes

SIR,—The letters of Drs. R. D. Lawrence, S. Levy Simpson, and Jas. C. Eaton in the *Journals* of July 15 and 29 on the marking of insulin syringes raise a matter which requires immediate attention.

The marking of insulin syringes manufactured in this country and on the Continent and which are in general use here is confusing, often leading to error when the requirements of the different strengths of insulin have to be calculated. For the past three years I have used 1 c.cm. insulin syringes made in the U.S.A. These are obtainable with two separate scales of graduations engraved on them to meet the requirements of the various strengths of insulin. Each syringe is graduated for two strengths of insulin—namely, 10 and 20 units per c.cm.; 20 and 40 units per c.cm.; and 40 and 80 units per c.cm. Each scale is clearly marked U.10; U.20; U.40; or U.80 to correspond with the appropriate strength of insulin used. For my own diabetic patients I order the syringe and instruct them to use the scale corresponding to the strength of insulin. In practice the syringe scaled for U.20 and U.40 is the one most commonly required, and if the strength of insulin has to be increased from 20 units per c.cm. to 40 units per c.cm. the patient is instructed to use the scale marked U.40 instead of U.20. No calculation is required and the margin of error is thus reduced.

The only disadvantage of these insulin syringes is that the American mount needle must be employed; the ordinary Record-type mount will not fit these syringes. These needles are not more expensive than a good Record-type needle, and the syringes have the additional advantage that they fit the Busher automatic injector, a useful

little instrument which provides for the comparatively painless automatic insertion of the needle at the proper depth and angle into the skin. This injector is particularly appreciated by those patients who are very nervous of inserting the needle into the skin.—I am, etc.,

London, N.W.2, July 28. M. FISHMAN.

"Medical Testament" on Nutrition

SIR,—The Panel Committee of Cheshire are to be congratulated on the interest they have aroused in the study of nutrition. I am sure the medical profession generally will agree with their conclusion that defective nutrition, both before and after birth, is at the root of many if not most of the ills that flesh is heir to. I feel, however, that criticism is called for as regards one or two points.

Though the members of the committee say, "We are not specialists, nor scientists, nor agriculturists," yet they do quote and apparently endorse the view that crops grown with artificial fertilizers are inferior as regards nourishing qualities to those grown with more natural manures, and that "artificial stimulus applied year by year . . . must breed evils, the full extent of which is as yet but dimly seen." I should like to hear what definite scientific evidence there is for this view, as I know it is not held by some scientific agriculturists of eminence and of long experience, also whether the Medical Research Council agrees with this view.

The term "artificial stimulus" also needs some justification in this connexion as tending to prejudice the judgment in favour of an as yet unproved theory. A "stimulus" can be applied to a human or any other sentient animal possessing nerves, but a so-called chemical "stimulus" to a plant can only be some form of food which is easily assimilable, like glucose is in the case of an animal. A paper dealing with the vitamin content of grain grown with farmyard manure, with complete artificials, and with no manure, respectively, was published in the *Journal of Agricultural Science* in 1934 (**24**, 410), and the work completely failed to detect any difference between them, and I am told that this has been confirmed by a later paper now in the press. Again, the testament says, "The relation between quality and yield, for example, does not lend itself to scientific formulae." Surely this is an unsafe statement to endorse. My old teacher at Guy's, Sir Frederic Taylor, used to say science is measurement, and any alleged quality which is not amenable to some kind of measurement should be scrutinized closely.

In conclusion, I should say that I quite realize the importance of utilizing, if practicable, town wastes for the enrichment of the soil which is our national heritage, especially because by this means I hope more men will be retained as workers on the land. The diminution in the numbers of agricultural "labourers," who are really skilled men producing the fresh protective foods which most poor people lack, but who are paid the wages of the unskilled, should be a matter of national concern. Why should the country worker be paid little more than half his opposite number in the town?—I am, etc.,

Leicester, July 29. N. I. SPRIGGS.

Insulin as External Dressing

SIR,—An article in the *Journal* of April 15 (p. 773) by Dr. A. R. Hunter, tending to disprove my work in connexion with the beneficial use of insulin in septic cutaneous conditions, has involved me in so much correspondence that I should like space to reply to these observations.

The ten cases cited by Dr. Hunter cannot be called a fair test. Two were of varicose ulcers in persons of 70 years of age; three referred to burns, which I have never suggested show any particular benefit; one was a callous ulcer of the buttock in a patient who died two days after the test; one followed an *x*-ray burn; and the rest did well. No extravagant claims have ever been made for insulin as a local dressing; but I cannot agree with Dr. Hunter that insulin is never more effective than a similar solution of the same *p*H which does not contain insulin.

In a series of thirty-three cases (*Medical Press and Circular*, December 21, 1938, and omitted by Dr. Hunter in his list of references) I found that twenty-four healed with insulin ointment, which was only used when all other dressings had failed. It is interesting to note that it cannot definitely be said that a case will do well with this type of dressing; in some cases the results are good; in others, apparently similar cases, the treatment is a complete failure.

In conclusion I would like to mention that all my patients were comparatively young and otherwise healthy.—I am, etc.,

London, W.1, July 24. NEVIL LEYTON.

Universities and Colleges

UNIVERSITY OF OXFORD

The following medical degrees were conferred in Congregation on July 29:

B.M.—N. A. Neville, L. E. C. Davies, J. M. Couchman, R. G. Eager.

UNIVERSITY OF CAMBRIDGE

The John Lucas Walker Studentship for original research in pathology, value £300 a year for three years, has been awarded to J. C. Colbeck, M.B., B.S.Lond.

UNIVERSITY OF LONDON

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

The following awards have been made:

Chadwick Trust Prize: Dr. R. C. Wofinden. *Duncan Medal:* Dr. R. J. Riddell. *Lalcaca Medal:* Dr. D. A. Cannon.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

At a meeting of the Royal College of Physicians of London, held on July 27, with the President, Sir Robert Hutchison, in the chair, the following were elected officers for the ensuing year: *Censors*, Sir Maurice A. Cassidy, A. Feiling, W. E. Hume, F. S. Langmead; *Treasurer*, Sir Charles Wilson; *Registrar*, H. Letheby Tidy; *Harveian Librarian*, Arnold Chaplin; *Assistant Registrar*, R. Hilton.

The following appointments were announced: Dr. H. Letheby Tidy (re-elected) as representative of the College on the General Medical Council; Lord Horder as Harveian Orator for 1940 (the Orator in October, 1939, will be Dr. R. A. Young); and Dr. Henry Cohen as Bradshaw Lecturer, 1940.

The Moxon Medal for researches and observations in clinical medicine was awarded to Sir Arthur Hurst; the Baly Medal for physiological researches to Professor C. H. Best of the University of Toronto; and the Weber Parker Prize and Medal to Sir Pendrill Varrier-Jones for his work on tuberculosis at the Papworth Village Settlement. The Murchison Scholarship was awarded to A. J. M. Drennan, M.B., of the University of Edinburgh.

Membership

The following candidates, having satisfied the Censors' Board, were admitted Members of the College:

D. R. Allison, M.D.Leeds, I. McA. Anderson, M.B.Glasg., H. C. Aston, M.B.Birm., D. A. K. Black, M.B.St. Andrews, C. R. B.

Blackburn, M.D.Sydney, W. A. Brend, M.D.Lond., M. E. Chinner, M.D.Adelaide, J. F. C. C. Cobley, M.B.Sydney, D. R. Davis, M.B.Camb., R. B. Evans, M.D.Lond., J. C. Gilroy, Major R.A.M.C., M.B.Ed., R. Lewthwaite, M.D.Oxf., B. J. Malley, M.B.Dublin, S. F. Marwood, M.D.Lond., W. M. Philip, M.B.Lond., W. N. Pickles, M.D.Lond., D. S. Scott, M.B.Camb., R. Southward, M.B.Glasg., J. F. Stokes, M.B.Camb., M. Toohey, M.B.Dublin, J. Walter, M.B.Oxf., H. T. H. Wilson, M.B.Camb., R. Wyburn-Mason, M.B.Camb.

Licences and Diplomas

Licences to practise were conferred upon the following 202 candidates (including seventeen women) who have passed the final examination of the Conjoint Board, and have complied with the by-law of the College:

S. Ackroyd, G. A. S. Akeroyd, T. D. Ap Ivor, R. H. Armin, J. W. Ashley, A. H. B. Atkinson, E. H. Bailey, J. P. B. Ball, Rosalind S. Barclay, P. H. Beales, A. D. Bell, A. J. S. Bell Tawse, C. J. Bintcliffe, T. Bliss, A. D. Bone, Irene M. Bower, L. H. Boyd, J. C. Bryce, F. R. Buckler, J. L. Cardwell, D. M. F. Carter, H. A. C. Chalmers, P. Chandra, C. K. Cole, F. Constable, J. F. Cooper, J. G. S. Crabbe, R. P. Crick, J. S. Crone, G. S. Cross, Barbara Cunningham, H. Das, P. H. Davison, P. F. H. Dawnay, J. H. Dean, V. K. Desai, E. P. De Silva, M. H. L. Desmarais, H. P. Dick, O. P. Dinnick, J. F. Donovan, A. J. Drew, F. L. Dyson, P. McA. Elder, S. D. Elek, J. R. Esplen, E. G. Evans, R. F. Evans, J. Feldman, Betty Fox, D. M. I. Freeman, R. C. Fuller, M. R. Gardiner, J. H. P. Gauvain, J. H. Gibson, P. W. W. Gifford, P. A. Gimson, F. N. Glover, J. A. Glover, N. G. Godfrey, G. D. Graham, R. N. Grant, J. H. Graves, R. A. Gregory, C. J. Griffin, A. Griffiths, P. Griffiths, S. Grodd, E. R. Gubbay, C. Hamwee, B. J. Harries, G. F. Hay, K. M. Hay, M. R. Hayes, G. C. Haywood, G. A. Helps, D. Hewspear, J. R. Holden, E. T. Holman, Hannah Horton, D. G. Howatson, Ruth M. Howitt, J. R. Hudson, F. R. Hurford, J. P. F. Hummel, J. C. A. Innes, K. G. Irving, P. W. Isaac, S. A. James, J. W. W. Jay, G. H. P. John, G. M. Jones, J. A. Jones, E. J. C. Kendall, D. S. Khatri, R. R. Klein, T. Kramer, W. C. Lawrence, G. C. Lee, A. A. Leigh, D. C. Lewin, Katharine I. Liebert, J. S. A. Linton, L. H. Lithman, J. A. Lorimer, F. Luckett, H. F. Lunn, I. D. MacDonald, F. McL. McGown, C. W. F. McKean, A. Mackler, P. D. MacLellan, L. A. H. McShine, J. E. Malcolm, R. M. Marshall, P. W. M. Martin, A. P. Massie, Zeta M. U. Matthews, A. J. May, W. R. May, I. Mazure, H. R. Miller, D. A. Miln, E. L. Moll, R. G. W. Moore, A. D. Newsholme, J. North, J. R. O'Dowd, A. O. A. Ohannessian, C. A. Osborn, G. A. Owen, Jeanne L. C. Palmer, F. H. Patel, Eleanor M. Pearson, H. N. Peyton, C. H. Phillips, F. R. Philps, M. F. Pilcher, J. W. Pooley, D. P. Porter, B. W. Powell, H. Pozner, C. L. Pretre, T. Price, T. G. Pritchard, Margaret P. Rhodes, J. E. Richardson, P. B. Riley, B. Robinson, B. Roditi, K. Rostron, D. Rumney, R. D. Rutherford, B. W. Sanderson, P. T. Savage, Margaret M. Scholefield, F. W. Schulenburg, P. D. Scott, I. Segal, D. B. Seymour-Price, Homa V.-ol-M. Shaibany, F. S. Shepherd, H. Shepherd, D. W. Shields, Joyce R. Simmons, C. S. Smalley, F. M. S. Smith, A. T. O. Speirs, W. A. H. Stevenson, B. A. Stoll, T. Sutton Coulson, Edith Taylor, S. F. Taylor, L. J. Temple, H. E. Thackray, F. D. G. Thomas, G. N. J. Thomas, R. G. Thomas, Margaret E. Thwaytes, J. C. Townley, W. G. Tregea, J. C. Turnbull, D. P. B. Turner, H. D. Venning, J. S. H. Wade, J. Y. D. Wakeham, D. B. Wallis, H. R. E. Wallis, E. Wardle, Margaret B. Webb, S. E. White, F. Whitwell, G. S. Wigley, A. F. Williams, E. Williams, Y. D. Williams, N. N. Wilson, G. E. W. Wolstenholme, B. W. Wood, I. A. P. S. Wood, J. C. Wyatt, W. J. Zorab.

Diplomas were granted, jointly with the Royal College of Surgeons of England, as follows:

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.—H. H. W. Bennett, M. L. Bynoe, D. A. Cannon, A. J. P. Coetzee, W. W. Cowen, J. E. F. de Soyza, C. McT. Hopkins, E. A. Hunter, L. H. James, Guan-Bee Kruatrachue, A. Limentani, J. M. Liston, K. J. Mann, P. E. C. Manson-Bahr, Ba Maung, R. W. D. Maxwell, M. O. Osnes, D. R. Prem, R. J. Riddell, Mariam P. Samuel, L. M. Sanghvi, D. K. Sundaresan, S. L. Townsend, M. K. Wasti.

DIPLOMA IN OPHTHALMIC MEDICINE AND SURGERY.—G. C. Banerji, C. J. F. Blumenthal, G. K. Burr, W. G. L. Flather, J. B. George, S. N. Gupta, J. Ll. Hart, B. G. Hill, R. G. Hodder, A. L. Issenman, T. J. P. Kerwick, Anne L. MacDonald, Annabella McGarrity, T. P. Myles, P. K. Pal, W. D. Piercey, Y. E. Pittar, H. B. Porteous, R. L. Raymond, Bridget F. Riordan, A. F. L. Shields, S. R. Sinclair, H. M. Singh, W. K. Smiley, Edith M. Spencer, H. Stange, H. McN. Symons, L. R. Wynter.

DIPLOMA IN MEDICAL RADIOLOGY.—L. M. Billingham, M. Das, M. Gelfand, B. D. Houston.

Diplomas in Anaesthetics were granted to the successful candidates whose names were published in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of June 17 (p. 1262), and Diplomas in Public Health (eight), Psychological Medicine (nineteen), and Laryngology and Otology (ten) were granted to the successful candidates whose names were published in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of July 22 (p. 206).

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the Royal College of Surgeons of England, held on July 31, with the President, Mr. Hugh Lett, in the chair, Mr. L. R. Broster was re-elected a member of the Court of Examiners, and Dr. Alan Moncrieff was elected to an examinership for the Diploma in Child Health under the Conjoint Board.

Mr. George Kent Harrison was reappointed a Leverhulme Scholar for a second year.

The Council decided to apply for the grant of a supplemental Charter to give the College power to grant a higher dental diploma entitled "Master Surgeon Dentist," and for power to elect annually to the Fellowship not more than four Members of the College of twenty years' standing.

Membership

Diplomas of Membership were granted to the 202 successful candidates whose names are published in the report of the meeting of the Royal College of Physicians of London on this page.

Diplomas

Diplomas in Tropical Medicine and Hygiene (twenty-four), Ophthalmic Medicine and Surgery (twenty-eight), and Medical Radiology (four) were granted, jointly with the Royal College of Physicians of London, to those candidates whose names are published in the report of the meeting of that College on this page.

The following hospitals were recognized under paragraphs 21 and 23 of the Fellowship regulations: Redhill County Hospital, Edgware (house-surgeons to the two senior surgeons, under special conditions); Grimsby and District Hospital (resident surgical officer only); Brisbane Hospital, Queensland.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—M. G. Braham, A. N. Coondoo, M. E. Davies, E. A. Griffiths, I. M. Monare, C. E. S. Myers, C. J. Pollard, D. Prysor-Jones, W. E. Roden, W. N. Vellacott.

MEDICINE.—C. V. Arthur, J. J. Brenner, A. N. Kalra, S. T. Nakib, C. J. Pollard, S. A. Schuyler, W. Simpson, A. T. M. Wilson.

FORENSIC MEDICINE.—C. V. Arthur, N. F. Bishai, J. J. Brenner, A. N. Kalra, S. T. Nakib, C. J. Pollard, S. A. Schuyler, W. Simpson, S. Smith, A. T. M. Wilson.

MIDWIFERY.—B. Gallivan, J. N. Hunt, A. G. McPhillips, N. A. St. C. Marley, T. Owen, C. J. Pollard, D. Prysor-Jones.

The Diploma of the Society has been granted to C. V. Arthur, N. F. Bishai, A. N. Kalra, I. M. Monare, C. J. Pollard, S. A. Schuyler, W. Simpson, S. Smith.

The Services

EFFICIENCY DECORATION

The King has conferred the Efficiency Decoration of the Territorial Army upon Majors W. E. A. Buchanan, C. A. Cowie, C. W. Dudley, G. A. Fisher, M.C., N. G. Hill, M.C., J. M. Smeaton, and W. J. C. Watt.

DEATHS IN THE SERVICES

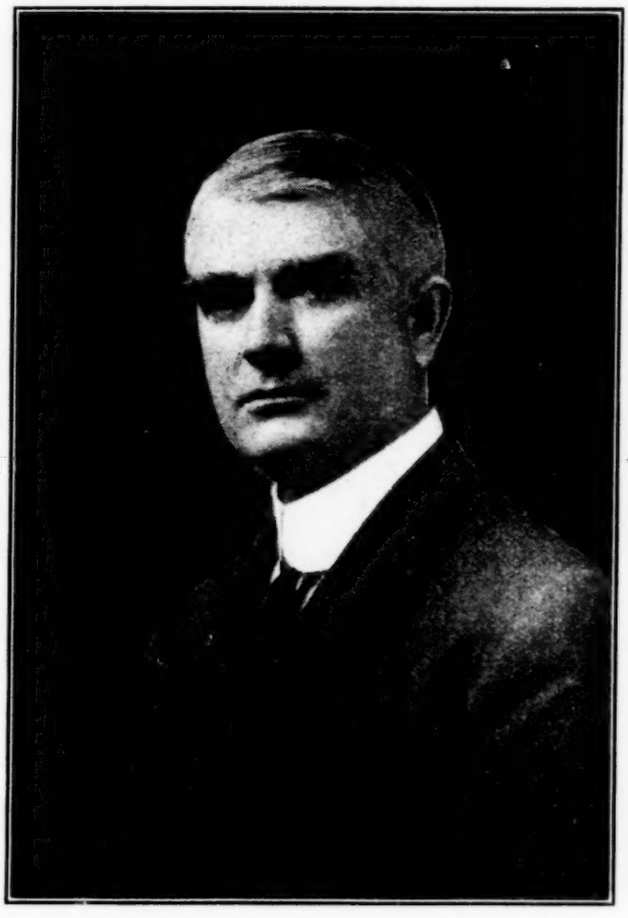
Major DONALD FREDERICK DYMOTT, Madras Medical Service (retired), died at Camberley on July 15, aged 83. He was born on July 5, 1856, the son of George Dymott, Esq., of the Southampton Customs, educated at University College, London, and took the M.R.C.S. in 1878 and the M.B.Lond. in 1879, also the D.P.H. of the London Colleges in 1898. Entering the Indian Medical Service as surgeon on March 31, 1880, he became surgeon major after twelve years' service, and retired on May 11, 1897. Most of his service was spent in civil employ in Madras, when he held the posts of professor of hygiene and physiology in the Madras Medical College, and first physician to the General Hospital, Madras. He served as assistant surgeon to the Russian Aid Society in the Russo-Turkish War of 1877–8, and in the Burmese Campaign in 1885–6, receiving the frontier medal with a clasp. He rejoined the Service in the war of 1914–18, when he filled the posts of president of No. 2 Medical Board in Camberwell in 1916–17 and of Deputy Commissioner of Medical Services under the Ministry of National Services in 1918–19.

Obituary

WILLIAM J. MAYO, M.D.

Co-founder of the Mayo Clinic

Dr. William J. Mayo, joint founder and director of the Medical and Surgical Clinic at Rochester, in the State of Minnesota, died on July 28, two months after the death of his younger brother, Dr. Charles Horace Mayo. Surgery has thus lost two of its greatest figures, who worked in harmony and professional partnership throughout their lives. The story of the early days of this wonderful family was briefly recalled in our issue of June 3. The father, Dr. William Worrall Mayo, was born at Eccles, Lancashire, and after studying at Owens College, Manchester, went out as a pioneer to Minnesota and practised at Rochester, then a small village. In 1894 the brothers decided to devote all their earnings, beyond a yearly sum sufficient to give them reasonable remuneration for their work, to furthering the cause of medical education and the welfare of the sick: from this resolve grew that community of educational foundations, hospitals, parks, and public buildings known throughout the world as the Mayo Clinic. In their unique enterprise William and Charles worked for fifty years in uniformity of purpose, one in their loyalty to the memory of their father and the ideals he set them, one in their devotion to duty and the public welfare.



William James Mayo was born at Le Sueur, Minnesota, on June 29, 1861. After graduating in medicine at the University of Michigan in 1883 he joined his father at Rochester, and the trio was completed a few years later by Charles. When the surgery of the hospital was divided between the two brothers Charles inclined to operations on the head and neck, William to those on the abdomen. As the work grew the three surgeons began to train assistants and to develop the team principle which has since become a feature of all English-speaking teaching hospitals. At the celebration of his seventieth birthday William Mayo paid tributes, not for the first time, to "the most important factor in what I may have accomplished—that is, my association with my brother. Something more than four years younger, Charlie has stimulated me by precept and example, and our association has been unique not only in the love and confidence we have for each other, but in having made an opportunity for two men to work as one and to share equally such rewards as have come. Even to this day, not only have our fraternal contacts been maintained, but also our habit of having a common pocket-book, in which each has wanted the other to have the greater share. And with due regard to the statement of a truth, my brother, Charles H. Mayo, is not only the best clinical surgeon from the standpoint of the patient that I have ever known but he has that essential attribute of the true gentleman—consideration for others."

Honours were showered upon the brothers in every country they visited. William became an honorary Fellow of the Royal College of Surgeons of England in 1913, and the Royal Colleges of Surgeons of Edinburgh and Ireland conferred the same distinction; he was also a Doctor of Laws of ten universities and Doctor of Science of three: M.Ch. of Trinity College, Dublin, and M.D. of the University of Havana. He was an honorary member of almost every surgical society in the world, and had been president of the American Medical Association in 1906–7. With his brother he rendered distinguished service during the war as joint chief consultant to the American Army.

Sir W. I. de C. Wheeler sends the following tribute to William and Charles Mayo:

Volumes could be written, and no doubt will be written, on what surgery owes to the efforts of these surgical pioneers, and what it has lost by their death. It is only possible for some to offer a humble tribute of respect, and to put on record briefly a feeling of deep personal loss. For twenty-five years I enjoyed the friendship of Drs. William and Charles Mayo, and several times had the happy experience of being a guest at their homes in Rochester, and of having these visits returned. A letter from William Mayo last month referred to the loss of his brother, and how he himself was making good progress after a severe operation. This was followed a few days ago by a telegram from the Clinic announcing his death.

These two brothers were not only the supermen whom the world of science has proclaimed, they were also simple lovable individuals, regarded with affection by countless disciples and friends. Their death leaves the realm of surgery with a feeling of void. There is an empty space, still obvious to all, but until recently illuminated by their personality and presence. On first acquaintance William Mayo appeared as an exceptional and somewhat

solemn administrator, sharing unique surgical gifts with his distinguished brother. Those who knew him better were aware of a keen sense of humour and a manner of expressing himself which was characteristic. In conversation he was usually serious; his philosophy was universal and deep. He could lighten an argument or discussion, while indicating dissent, by a remark such as this: "The man who performs that operation upon me will have to run a great deal faster than I do." He invited me on one occasion to see "Charlie" perform prostatectomy. "Watch his foot," were my instructions. "It synchronizes accurately with the movements of the enucleating finger." Charlie Mayo had a different way of poking fun: he often framed his sayings in the form of proverbs; his maxims are common property, and are unforgettable. The expression of his face did not alter until the arrow of his wit had reached the mark. I was in the theatre when he delighted his visitors by an amusing explanation of why different members of the staff pronounced the word "appendicitis" with a varying intonation and syllabic inflection. At a function of the American College of Surgeons some of us were expected to wear academic dress. By an oversight none was provided. Charlie Mayo came to my rescue. He said, "You must wear and keep Will's cap and my gown." With autographed tapes attached, this cap and gown are treasured possessions.

Many years ago, as a raw recruit, I visited some of the surgical centres nearer home. There were certain individual surgeons who appeared to work in a new and impressive manner, and who had abandoned a timeworn outlook. These outstanding few were the early pilgrims who had visited the Mayo Clinic. They had returned with visions of reform, and they urged their professional friends to travel west. Thus the Mayo mode of working trickled from the fountain head, the trickle became a stream of knowledge, percolating as time went on through every surgical centre in the world. This was a period when surgeons were still operating with one eye upon the clock and team work was only a name. Nothing pleased the Mayos more than a demonstration to visitors of methods employed by surgeons elsewhere. It was part of a religion to give generous credit and acknowledgment when these methods were adopted in the Clinic.

Mere contact with the Mayo brothers was an inspiration and an education. It is difficult to say whether the visitor derived more benefit from joining them in professional rounds and watching a choice of thirty or forty major operations or from being with them in the simplicity of the family circle when work was done. The world-wide feelings of respect and admiration which follow Drs. William and Charles Mayo to the grave will fortify their successors in their loss. It will assist them, with the sympathy of all, in keeping the future of the Mayo Clinic on the solid foundations of the past.

W. E. COOKE, M.D., F.R.C.P. Lond. and Ed.,

Consulting Pathologist, Wigan Infirmary

We regret to report the death on July 20 of Dr. William Edmund Cooke. Born at Aspull, near Wigan, in 1881, he was educated at Bullingham, Hereford, Ampleforth College, York, and the University of Liverpool. He graduated M.B., Ch.B. in 1904, being one of the first four to graduate from the then recently founded University of Liverpool; he proceeded M.D. ten years later. For some years he worked in the laboratories of comparative pathology and bacteriology, and was in practice with his father at Aspull for a short time. In 1911 W. E. Cooke went to India, the Malay States, and China, where he studied port sanitary administration with special reference to epidemiology. The following year he was appointed assistant to the medical officer of health for Bermondsey, and in 1913 became medical superintendent of the Ochil Hills and Coppins Green Sanatoria, Scotland, taking the D.P.H. and M.R.C.P.Edin. in the same year, while continuing his research work on the pathology and radiology of pulmonary tuberculosis, and beginning investigations in haematology. Early in 1915 he received a commission in the R.A.M.C. and was placed in charge of an isolation hospital in Aldershot during the epidemic of cerebrospinal fever. He was elected F.R.C.P.Ed. in 1917, at the end of which year he was sent to Egypt, and was medical officer in charge of the troopship *Aragon*, which was torpedoed outside Alexandria with the loss of 700 lives. In Egypt he remained in charge of laboratories and medical and isolation divisions until the autumn of 1919. Returning to England, he was appointed senior assistant and deputy medical officer of health and also pathologist to Bermondsey. In 1921 he went back to Wigan, and five years later took the M.R.C.P.Lond., his election as F.R.C.P. following in 1934; he was one of the very few who have held both Fellowships of London and Edinburgh. He was a member of the examination board of the Royal College of Physicians of Edinburgh. In 1931 he had been the recipient of a complimentary luncheon and a civic reception in Wigan in recognition of his work for medicine in Lancashire and for the panel patients of the county. He had joined the British Medical Association in 1922, and was a joint secretary of the Wigan Division from 1927 to 1935, becoming chairman of it in 1937–8. He was secretary of the Section of Public Health at the Centenary Meeting of the Association in 1932.

A research worker of international repute, W. E. Cooke made frequent contributions to the scientific literature of Great Britain, the United States, France, and Germany. One of his outstanding works related to haematology; he was also well known for his recognition of asbestosis as a dangerous disease of miners, and his insistence on silicosis as the primary cause of asbestosis had practical prophylactic sequels of great value, acceptance of this fact by the Home Office following quickly. Some of his early papers on this subject were published in the *British Medical Journal*. He was especially skilled in microscopy and geology, and his microscopical studies in pernicious anaemia proved to be of historical significance. His portrait has been placed in the gallery of distinguished haematologists in King's College, London.

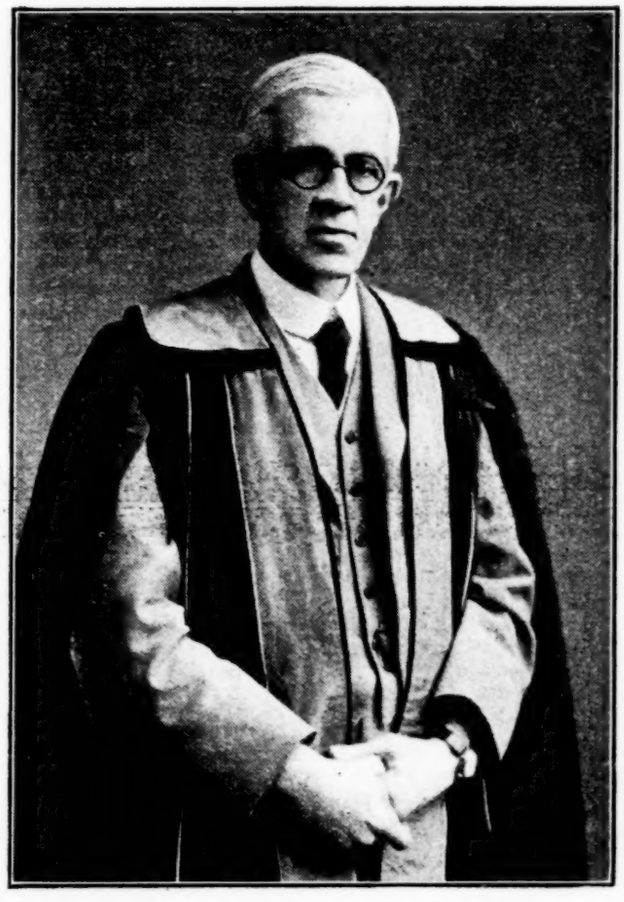
Mr. Cecil Edward Marriott, who died on July 21, was for some years senior honorary surgeon to the Leicester Royal Infirmary and Children's Hospital. A native of Leicester and son of Sir Charles Marriott, F.R.C.S., D.L., he was born in 1870, and from Uppingham School went to Cambridge as a medical student, and thence to University College Hospital. He took the English conjoint diploma in 1896, the M.B., B.Ch. of Cambridge in 1900, the M.Ch. in 1903, and the F.R.C.S.Eng. in 1904. His long connexion with the Leicester Royal Infirmary began as house-surgeon after he had held three resident posts at University College Hospital. During the war he served as major R.A.M.C.(T.) in charge of military cases at the infirmary, and he was also attached to the Northern General Hospital and the Wistow Auxiliary Hospital. Mr. Marriott had been president of the Leicester Medical Society, and at the Annual Meeting of the British Medical Association in that city in 1905 he was honorary secretary of the Section of Surgery.

ARCHIBALD YOUNG, M.B., C.M.,

F.R.F.P.S., Hon. F.A.C.S.,

Regius Professor of Surgery, University of Glasgow

Professor Archibald Young, who had held the regius professorship of surgery in the University of Glasgow since 1924, died on July 23 at the age of 65. It was only on July 17 that he was presented with his portrait by a group of friends and subscribers in the Hunter Hall of the University. The date was advanced at his own request, and he was weak and in pain at the ceremony. One of his last tasks was the translation from the French of Professor René Leriche's book *The Surgery of Pain*, which was acknowledged in these columns and elsewhere as one of the most valuable of Professor Young's many contributions to surgical literature.



The son of W. F. Young, he was born on November 10, 1873, and was educated at Glasgow High School and the University. He took the B.Sc. in 1893, the M.B. and C.M. with high commendation in 1895, and then studied in Berlin, Breslau, and Heidelberg. Before settling down in surgical practice at Glasgow he went to Kroonstad during the South African War and served as civil surgeon to No. 3 General Hospital. During the war of 1914–18 he was attached to No. 4 Scottish General Hospital as neurological expert with the rank of major, R.A.M.C.(T.), and advanced his reputation with work on nerve injuries. He became an authority on plastic surgery, the operative treatment of fractures, injuries to peripheral nerves, brain operations, and the surgery of the sympathetic nervous system.

In 1902 Archibald Young had been elected assistant surgeon to the Western Infirmary at Glasgow, and for several years he assisted Sir William Macewen, whom he succeeded in the regius chair of the University after some years as professor of surgery and dean of the Anderson Faculty of Medicine. He had frequently acted as examiner in surgery for the Royal Faculty of Physicians and Surgeons of Glasgow, of which he became a Fellow in 1913 and later president; he had also been president of the Glasgow Medico-Chirurgical Society.

Archibald Young's reputation reached far beyond Scotland. In 1926 he went to the United States to deliver the Murphy Oration, taking as his subject "Sir William Macewen and the Glasgow School of Surgery," and received the honorary fellowship of the American College of Surgeons, of the American Surgical Association, and of the Academy of Surgery of Philadelphia. In the following year he was elected a member of the Rome Academy of Medicine and Surgery, and he was an honorary M.D. of the University of Strasbourg. Noteworthy among his many surgical papers was one dealing with the operative treatment of fractures which he contributed to the Surgical Section of the British Medical Association at the Annual Meeting in Glasgow in 1922. In 1926–7 he presided over the Association of Surgeons of Great Britain. As a result of work with *x* rays he sustained serious injury to one hand, including the loss of several fingers. He was seldom free from pain during the last few years, but remained at his post. It was in view of his intention to retire from the regius professorship at the end of September that the portrait in oils by James Gunn was subscribed for by friends and pupils. Throughout his long career as a teacher in the Glasgow medical school Archibald Young impressed upon students and junior colleagues the need for co-operation. His own life bore testimony to his firm belief that the key to the future of scientific surgery must be found in research and single-minded devotion to truth. A man of strong personality and fine courage, both moral and physical, he was not to be deterred from attending the ceremony planned in his honour.

The funeral service was held in Glasgow University Chapel on July 26, conducted by the Right Rev. Professor Archibald Main, Moderator of the General Assembly of the Church of Scotland, assisted by the Rev Dr. J. W. Coutts of Melrose. The Chancellor of Glasgow University, Sir Daniel Stevenson, and the Vice-Chancellor, Sir Hector Hetherington, attended the service with the Senate of the University and representatives of the medical profession and public life in Glasgow.

Professor J. R. Learmonth writes:

Perhaps the most valuable of the many lessons imparted by Professor Young to his pupils was the importance of painstaking attention to detail. He was a man of the highest professional ideals, and to each of his patients, whether private or in hospital, he gave the same careful attention. He exacted the same standard from those who worked with him, and if at times the training seemed Spartan and one's life a succession of things one didn't know or hadn't done, increasing experience has shown the value of his method; and there must be many who feel, as I feel, that no grounding could have been better.

[The photograph reproduced is by Annan, Glasgow.]

Medico-Legal

ILLEGAL USE OF TITLE "M.D."

The Medical Defence Union recently prosecuted one Arthur Fred Day at the Westminster Police Court, before Mr. Clyde Wilson, for wilfully and falsely using the description of medical examiner and the title of doctor of medicine, in breach of the Medical Act, 1858. By that Act it is forbidden for a person who is not on the *Register* to use the title of a physician, doctor of medicine, or any of several other specified titles, or "any name, title, addition or description implying that he is registered under this Act, or that he is recognized by law as a physician, or surgeon, or licentiate in medicine and surgery, or a practitioner in medicine, or an apothecary."

Day completed and forwarded to the Air Ministry a form of medical examination for a private air pilot's class "A" licence in connexion with an application for enrolment in the Civil Air Guard. The form states that the medical examiner must be a registered medical practitioner with British qualifications. Day witnessed the applicant's signature on the front of the form, and also wrote his name in block letters on the back of the form in the space provided for the signature of the medical examiner. Beneath his name the defendant put "M.D.," followed by an undecipherable scrawl. He was prosecuted by the Medical Defence Union for wilfully and falsely using the description of medical examiner, thereby implying that he was registered under the Medical Act, 1858; and also for wilfully and falsely using the title of doctor of medicine. The defendant's legal representative said that he had been unwell when he completed the form, and was in a state of anxiety owing to his brother's illness and did not pay proper attention to the matter. The defendant, he added, had done all he could to indicate that he was not a registered medical practitioner in this country by putting in brackets after the degree "M.D." the letter "J.," which indicated that he obtained the degree at Jefferson College, Chicago. He produced Day's name-plate, which read "Mr. Day, Homeopath," and said that the defendant had had no intention to mislead anyone. Day, giving evidence, said he had not read the form before signing it, and that he understood from the applicant that his examination was only a preliminary one. The magistrate fined Day £1 and ordered him to pay ten guineas costs on the summons for using the title "M.D." He did not deal separately with the other summons.

DAMAGES AGAINST TWO QUACKS

In an action before Mr. Justice Cassels tried on July 11[1] Mrs. M. S. Shallard was awarded £788 damages and costs against Arline Constance Arline, carrying on business as the Natural Health Clinic, of 14, Herbert Crescent, Knightsbridge, and against Carl Gustafson, of the same address and of 3, Carlisle Place, S.W.1. Counsel for Mrs. Shallard said that in March, 1938, she was ill and exhausted. Miss Arline, whom she had known for some years, told her that she had a clinic and that she was in contact with a Dr. Gustafson, who was a wonderful man with a system of making women fit by rejuvenating them. On the same day Mrs. Shallard met Gustafson, who said he would make her fit and well. After examination by a person whom Gustafson called "Dr. Macnab," but who was not qualified, she entered Miss Arline's clinic and was put to bed. A substance was applied to her face which burnt her violently, and she was given tablets which made her vomit. Next day she was placed in a bath of Epsom salts, and her body was covered by a rash. Four days later, when she begged to be allowed to go home, bandages were taken off, which tore the skin from her forehead and neck, leaving them raw and bleeding. Her eyes were discharging continuously. She lay in pain without medical aid for ten days, and then, on her insistence, was driven home. In August she had a complete nervous breakdown, her life was despaired of, and her health was seriously impaired. Mr. Gustafson, a Swede, had left the country, as the Home Office would not allow him to remain. She had paid 200 guineas to the defendants, and knew that she could not recover any damages or costs.

Dr. H. C. Semon said that Mrs. Shallard's condition was consistent with the experiences she described, but she was very much on the mend, and there would be no permanent effect on her general health. Miss Arline, who called no evidence and conducted her own case, said she had brought Mrs. Shallard and Gustafson together in good faith, believing that his treatment would be beneficial. She had seen other patients thoroughly satisfactorily treated by him. In that belief she had placed the treatment rooms of her clinic at his disposal. Neither she nor her staff had been engaged in Mrs. Shallard's treatment. She denied that she was responsible for its results, or that her clinic was not run in a clean or efficient way, or that any of the staff were negligent, or that she had been guilty of fraud or fraudulent intent. Fully qualified doctors had used the clinic, which had been under the auspices of the London County Council, and she had never had a black mark. The attendants were properly qualified and were all approved by the L.C.C. She knew that Gustafson was not qualified, and she never called him "Dr." He was a fully qualified chiropractor in America.

The learned judge, in giving judgment, remarked that Gustafson, in a way which belied the manly appearance presented by him on his brochure, had left Miss Arline to defend the action alone. The evidence satisfied him that Miss Arline was a fraudulent person along with Mr. Gustafson, and that they had divided the proceeds of that fraudulent scheme for extracting money from a trusting widow, an exhausted, nervous, middle-aged woman. He had no evidence before him whether, at the time that the treatment was given, the clinic was licensed by the L.C.C. If it was, then it was unfortunate that no inspector knew what was going on. He then gave judgment for Mrs. Shallard.

[1] *Times*, July 12, 1939.

Medical Notes in Parliament

The Royal Assent was given on July 28 to the Finance Act, the House to House Collections Act, and the Milk Industry Act.

In the House of Lords on August 1 the Public Health (Coal Mine Refuse) Bill passed the remaining stages. The Marquess of Zetland announced that it was proposed to adjourn the House on August 4 until October 3. Steps had been taken to summon the House sooner should the necessity arise.

A resolution for an identical adjournment of the House of Commons was moved on August 2. The subjects discussed in the Commons this week included civil defence.

The annual report of the Chief Inspector of Factories for 1938 was presented to Parliament on July 31, and the annual report of the Board of Control was presented on August 1.

Analgesia by Midwives

Dr. EDITH SUMMERSKILL inquired on July 27 whether the attention of Dr. Elliot had been drawn to the resolution passed by the British Medical Association deprecating the use of an analgesic by midwives; and whether, with a view to countering any ill effects of this resolution, he would make a statement to reassure the public as to the complete safety of the administration of gas by midwives. Dr. ELLIOT in his reply recalled that in January, 1936, following a careful investigation, the Royal College of Obstetricians and Gynaecologists reported that the administration of nitrous oxide and air by Dr. Minnitt's apparatus was safe for use by midwives under specified conditions. The Central Midwives Board in October, 1936, accordingly passed a resolution recognizing as treatment within the province of a midwife the administration

of gas-and-air by Minnitt's or similar apparatus for the purpose of producing analgesia during labour, subject to the following conditions specified by the college: (1) that the midwife, either before or after enrolment, received at an institution approved by the Board for the purpose special instruction in the essentials of obstetric analgesia, and had satisfied the institution that she was thoroughly proficient in the use of the apparatus; (2) that the patient had within one month before her confinement been examined by a registered medical practitioner who had handed to the midwife a certificate in writing that the patient was in a fit condition for gas-and-air administration; and (3) that one other person, being a State-certified midwife, or a State-registered nurse, or a senior medical student, or a pupil-midwife, was present at the time of administration in addition to the midwife in charge of the case.

Dr. ELLIOT said the ruling of the Central Midwives Board was the ruling of the statutory authority responsible. It allowed the administration of analgesics by midwives in circumstances regarded as safe by the Royal College of Obstetricians and Gynaecologists. Under such circumstances the public could be completely reassured as to the safety of the administration of gas by midwives. He further informed Dr. Summerskill that according to returns made by local supervising authorities, up to December 31, 1938, twenty-nine of the 188 authorities concerned had made arrangements approved by the Central Midwives Board for the instruction of midwives in the administration of analgesics.

Replying to supplementary questions, Dr. ELLIOT said the practice of allowing midwives to administer an analgesic under the conditions he had stated could not be interfered with. That was the ruling of the Central Midwives Board, which was the statutory authority. The conditions could be complied with by midwives even in distant parts of the country. It was desirable that some other person beside the midwife should be there.

Miss RATHBONE referred to "the selfish attitude of a certain portion of the medical profession who expressed their views the other day."

Personnel of Medical Boards

On July 27 Mr. ERNEST BROWN said he was not aware that there was general discontent among practitioners at the personnel of the medical boards. The panels from which the doctors were drawn consisted of practitioners whose names were supplied by the British Medical Association to the medical officers of the Ministry of Health. Any practitioner who desired to offer his services should communicate with the secretary of the local emergency committee of the British Medical Association so that he might be considered in the event of any further appointment being made to the panel. He did not think that it would be in the public interest to change the composition of the panels yearly. The medical boards each consisted of a chairman and four members. Each of the four members carried out a part of the examination and the chairman supervised the whole. The members were paid two guineas a session (normally about two and a half hours) for the first five sessions in a week, and one and a half guineas for any subsequent session in the week. The chairman received an additional half-guinea. Twenty-five to thirty men were examined at a session and the average time taken per man was about twenty-five to thirty minutes. The Military Training Act made no provision for appeals against decisions of the medical boards. If, however, fresh medical evidence was produced which suggested that a man had been wrongly graded, that evidence was placed before the chairman and, where necessary, the man was re-examined.

Remuneration of Civil Nursing Reserve

Dr. ELLIOT announced on July 28 that trained nurses supplied by the Civil Nursing Reserve would in war time receive for whole-time service a flat rate of £90 a year plus board and lodging. The corresponding rate for assistant nurses would be £55. Trained nurses in charge of wards would have an additional allowance of £20 a year. In certain cases an assistant nurse could receive up to £65 per annum. To these rates would be added free laundry, or 3s. 6d. per week in lieu of laundry. These rates had been recommended by the Central Emergency Committee for the Nursing Profession, which included representatives of the General Nursing Council, the Royal College of Nursing, the voluntary hospitals, and the local authorities. Where trained nurses or assistant nurses were not provided with board and lodging an additional sum of one guinea a week would be payable. The rate for nursing auxiliaries would be £2 a week non-resident for whole-time service.

Cheap Milk Scheme

On July 31 Dr. HADEN GUEST asked the Minister of Agriculture when he anticipated that the plan for providing cheap milk for expectant and nursing mothers and children under 5 years, as provided under the Milk Amendment Act, 1938, and under the Milk Bill of 1939, would come into operation. Sir R. DORMAN-SMITH said that a scheme for the provision of milk to local authorities in England and Wales at reduced prices for consumption by expectant and nursing mothers and children under 5 was submitted by the Milk Marketing Board and approved by him on July 26. The scheme would come into force as from July 31, and he hoped that it would be possible to lay it before Parliament within the next day or two. The Minister of Health would issue at the same time a circular letter and an explanatory memorandum to local authorities, with whom the initiative would then rest. He could not at present say how soon it might be possible to bring the arrangements into operation in any given district.

Birth Rate Increase

On July 31 Sir ARNOLD WILSON asked the Minister of Health the total and percentage diminution in the number of births registered in 126 great towns and cities for which weekly figures were obtained, during the first thirty weeks of 1939, compared with the corresponding period of 1938, and for the nine weeks ended July 2, 1938, compared with those ended July 1, 1939. Dr. ELLIOT said that the following were the figures. In each case they represented an increase and not a diminution:

Live Births in the 126 Great Towns, England and Wales

First twenty-nine weeks of 1939 (to July 22), compared with corresponding period of 1938: Increase of 849 births, or 0.46 per cent.

Nine weeks ended July 1, 1939, compared with nine weeks ended July 2, 1938: Increase of 721 births, or 1.2 per cent.

M & B 693 for Panel Patients.—Dr. EDITH SUMMERSKILL asserted on July 27 that as the result of investigations it had been revealed that a large number of medical insurance practitioners hesitated to prescribe M & B 693 for fear they would not be reimbursed. Dr. ELLIOT hoped that the emphatic statement which he had made in the previous week on this subject would have dispelled any such hesitation.

Report on Tuberculosis Services in Wales.—Mr. JAMES GRIFFITHS asked Dr. Elliot on July 27 how many local authorities sent to his Department their observations upon the Report on Anti-Tuberculosis Services in Wales; what proposals had been submitted by them for dealing with the evils revealed in the report; and what steps were being taken by his Department. Dr. ELLIOT said that of seventeen local authorities whose observations on the report were invited, two sent comprehensive replies, four submitted replies covering a substantial part of the issues, and the rest still had the report under consideration. The stage had not been reached at which the views of the local authorities could usefully be analysed. As soon as that position was reached he proposed to call a conference of all the interested authorities.

Death Rate among Disabled Pensioners.—Sir WALTER WOMERSLEY, on July 31, told Mr. Ellis Smith that the number of deaths from all causes of disability pensioners of non-commissioned rank in the financial year ended March 31 was 7,480. This represented a death rate of 18.9 per 1,000 pensioners. The death rate for the corresponding age group in England and Wales was approximately 12.9 per 1,000.

Pharmaceutical Services in the Army and R.A.F.—On July 25 Mr. THORNE asked Mr. Hore-Belisha to consider setting up a committee, under the Director-General of Army Medical Services, with the object of organizing an efficient pharmaceutical service for the Army and the Royal Air Force. Mr. HORE-BELISHA said that Sir Kingsley Wood and he were satisfied that the dispensing requirements of the Army and the Royal Air Force were adequately met by existing arrangements.

Notes in Brief

The majority of the tubes for mobile *x*-ray apparatus ordered for the emergency hospitals are to be British and the remainder American. In the present state of the industry it would not be practicable to insist upon the exclusive use of British tubes.

The Silicosis Medical Board issued fourteen certificates in 1935, seventeen in 1936, eighteen in 1937, twenty-eight in 1938, and seven in the first six months of 1939 to workers in Scotland outside the coal-mining industry who were suffering from silicosis.

In response to Dr. Elliot's appeal for extra nurses and auxiliary nurses by June 30 over 9,000 trained nurses and assistant nurses had been enrolled, and 45,000 women had applied for training as nursing auxiliaries. In addition about 24,000 immobile nursing members of voluntary aid detachments have been released from their service obligations with a view to their becoming available as nursing auxiliaries. Enrolment of these is now proceeding.

Medical News

The House of the British Medical Association, including the Library, will be closed from 5 p.m. to-day (Friday, August 4) to 9 a.m. on Tuesday, August 8 (Library 10 a.m.).

The Royal College of Physicians of London is closed for cleaning until Monday, September 11.

The forty-third Congress of French-speaking Alienists and Neurologists will be held at Montpellier under the presidency of Professor H. Roger of Marseilles from September 21 to 26, when the following subjects will be discussed: Mental anorexia, introduced by Dr. A. Crémieux of Marseilles; the immediate and remote neurological and psychiatric problems of cranial traumatism, introduced by Drs. Schmite and J. Sigwald of Paris; and the conditions for discharge of the criminal or delinquent insane, introduced by Dr. Pierre Léculier. Further information can be obtained from Professor P. Combemale, Route d'Ypres, Bailleul, France.

The seventh Congress of the International Association of Preventive Paediatrics will be held at Lausanne on September 22 and 23, when the following subjects will be discussed: prophylaxis of physical and mental disorders during puberty; protection of mother and child in rural areas. Further information can be had from the secretary of the association, 15, Rue Lévrier, Geneva.

The annual dinner of St. Mary's Hospital Medical School will be held at Claridge's on Saturday, September 30, at 7.30 p.m., when Dr. Walter Broadbent will be in the chair. The annual postgraduate course, open to all medical practitioners without fee, will take place on Thursday, Friday, Saturday, and Sunday, September 28, 29, and 30, and October 1.

The annual Old Students' Dinner of St. Thomas's Hospital will be held on Friday, October 6, at 7.45 p.m., at the Dorchester Hotel, Park Lane, W., with Professor H. R. Dean in the chair.

Lord Horder, president of the Chinese Medical Aid Committee, and Lady Horder welcomed the guests at a reception held in London at B.M.A. House on July 26 to meet doctors from the refugee camps in the South of France who are being equipped and sent to China by the committee. The organizing secretary is Dr. Joan McMichael, 121, Westbourne Terrace, W.2.

On August 3 the Minister of Health opened an exhibition, illustrating the work of the Civil Nursing Reserve, in the ticket hall at Charing Cross Underground Station. The exhibition, which is designed to emphasize the need for trained nurses and others to enter the Civil Nursing Reserve for dealing with air raid casualties in time of war, includes a number of historical relics associated with nursing from Roman times to Florence Nightingale's work in the Crimea.

The Medical Research Council has appointed Gwenvron M. Griffiths, M.D., M.R.C.P., to the Kathleen Schlesinger Research Fellowship for the year 1939–40. The Fellowship is provided from a fund established by the late Mr. Eugen M. Schlesinger and Mrs. Schlesinger in memory of their daughter, and is given for investigations of cysts of the brain or allied conditions. It is ordinarily tenable at the National Hospital for Diseases of the Nervous System, Queen Square, London.

EPIDEMIOLOGICAL NOTES

Diphtheria and Scarlet Fever for the Week

With the exception of diphtheria and scarlet fever, notifications of the principal infectious diseases have shown a tendency to decline during the week in the areas for which returns were made. In England and Wales 870 cases of diphtheria were notified, compared with 836 in the previous week, but the number remains below that for the corresponding week last year and the median value for the last nine years. Changes were noted in Birmingham 32 (33), Leicester 13 (11), Liverpool 19 (15), Sheffield 21 (22), South Shields 8 (5), and Yarmouth 10 (3). Notifications of scarlet fever in England and Wales showed a considerable increase, in which London has shared, over the number notified in the previous week, and is higher than the figures for the corresponding week last year and the median value for the last nine years. Increases were recorded in London 191 (181), Blackpool 13 (6), Bolton 13 (5), Bristol 21 (18), Birmingham 35 (33), Chingford 15 (8), Coventry 43 (30), Hull 23 (12), Ilford 16 (12), Leeds 33 (28), Leicester 17 (13), Leyton 16 (11), Liverpool 56 (42), Manchester 35 (31), Nottingham 28 (15), Plymouth 18 (8), Tottenham 27 (23), Wallasey 10 (3), and Willesden 11 (1). The return of scarlet fever in Scotland was only 1 more than last week and is well below the figures for last year and the last nine years.

Notifications of acute poliomyelitis for England and Wales were 16, the same as last week, against 19 for the corresponding week last year. Cases have been reported from eight counties, London with 6 (Camberwell 4, St. Pancras and Wandsworth 1 each), Middlesex 3 (Hendon, Finchley, Yiewsley and West Drayton 1 each), Lancaster 2 (in Manchester), Essex County 1 (Clacton), Kent 1 (Canterbury), Somerset 1 (Yeovil), Stafford 1 (Cannock), West Riding of Yorkshire 1 (Sheffield). The only area in which spread appears to have taken place is Camberwell, with 4 cases compared with 1 in the previous week.

General Infant Mortality

In the *Weekly Epidemiological Record* of the League of Nations the infant mortality figures for 1938 are given for the principal countries in the world. In most European countries there has been a marked decrease in infant mortality during the last two years compared with the average rates for the years 1931–5; the decrease was between 18 and 23 per cent. in the Netherlands, Germany, Austria, Latvia, Lithuania, and Sweden. In England it was 16.1, in Hungary 14.6, and in Scotland 13.6. Increases were recorded in Poland and Rumania. The provisional data referring to 1938 available for nineteen countries of Europe showed a decrease in fifteen countries as compared with the previous years. An increase was recorded in France, Luxembourg, Poland, and Rumania. Decreases were recorded in the United States of America 51 (59) and Australia 38 (41), but there was an increase in New Zealand 36 (32). Figures in parentheses are the average values for the years 1931–5.

No. 29

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended July 22, 1939.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1939					1938 (Corresponding Week)					1930-8 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	28	5	10		—	19	3	12	2	1		
Deaths		—	—				1	2				
Diphtheria	870	66	110	30	17	1,031	155	123	45	37	944	160
Deaths	13	2	4	—	—	27	3	8	3	—		
Dysentery	30	5	24		—	32	7	32		—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	4	—	1	1	—	3	1	—	1	—		
Deaths		1					—					
Enteric (typhoid and paratyphoid) fever	21	6	7	8	1	19	3	4	6	1	59	
Deaths	—	—	—	—	—	—	—	—	—	—		
Erysipelas		29	35	5	2			57	6	3		
Deaths		—					—					
Infective enteritis or diarrhoea under 2 years												
Deaths	36	11	5	4	7	57	19	13	6	5		
Measles		50	38		6			117		12		
Deaths	2	—	1	—	—	6	2	—	—	1		
Ophthalmia neonatorum	92	6	24		—	97	8	30		2		
Deaths												
Pneumonia, influenza!*	474	27	6		3	493	33	9	1	9	477	36
Deaths (from influenza)	6	—	2	—	1	19	3	3	—	—		
Pneumonia, primary			132	14				115	4			
Deaths		9		9	8		14		12	9		
Polio-encephalitis, acute	2	—				10	—					
Deaths		—					—					
Poliomyelitis, acute	16	6	1		—	19	—	10		—		
Deaths		—					—					
Puerperal fever	6	6	9	2	—	3	3	7	4	—		
Deaths		1†					1					
Puerperal pyrexia	188	19	27		—	165	8	19		7		
Deaths												
Relapsing fever	—	—			—	—	—			—		
Deaths												
Scarlet fever	1,925	191	180	52	55	1,791	191	282	66	67	1,700	212
Deaths	1	—	1	—	—	3	1	2	—	—		
Small-pox	—	—	—		—	2	—	—		—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths				—	—				—	—		
Whooping-cough		211	35		9			16		7		
Deaths	8	2	3	—	—	7	1	3	—	1		
Deaths (0-1 year)	262	52	53	26	21	272	52	67	19	11		
Infant mortality rate (per 1,000 live births)	41	47				45	43					
Deaths (excluding stillbirths)	3,738	670	558	176	152	3,853	678	599	163	118		
Annual death rate (per 1,000 persons living)	9.2	8.6	11.3	11.8	13.4	9.5	8.6	12.2	11.0	10.5		
Live births	6,177	1,027	904	326	317	6,979	1,275	898	400	280		
Annual rate per 1,000 persons living	15.2	13.2	18.3	21.9	27.8	17.1	16.2	18.3	27.1	24.8		
Stillbirths	213	40	46			258	42					
Rate per 1,000 total births (including stillborn)	34	32	48			36	32					

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.
† Death from puerperal sepsis.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Auto-haemotherapy for Asthma

"P. H. M." asks for references to articles on the treatment of asthma by taking from a vein some amount of blood and injecting the blood into the patient again.

*** Daze and Dumas reported two cases of asthma treated by auto-haemotherapy (*J. de l'Hôtel-Dieu de Montréal*, 1937, **6**, 145). Maddox and Back reported an inquiry into the value of auto-haemotherapy in juvenile asthma (*Arch. Dis. Childh.*, 1935, **10**, 381), and discussed auto-haemotherapy in bronchial asthma (*Med. J. Austral.*, 1935, **1**, 277); also Moruzzi (*Policlinico, Sez. Prat.*, 1935, **42**, 905) and Levin (*Rev. Ass. méd. argent.*, 1934, **48**, 1494). Our correspondent may also be referred to page 253 of the third edition of Bray's *Recent Advances in Allergy*, 1937.

Herpes Zoster and Labyrinthitis

Dr. L. I. HARDY (Hull) writes: Just recently I have experienced in my practice a small epidemic of herpes zoster and also acute labyrinthitis. The latter consisted of sudden headache, vomiting, and severe vertigo, which lasted about one to two weeks and was completely apyrexial. In no case was there any definite otitis media, and the two conditions of herpes zoster and labyrinthitis did not coexist in any one patient. Nystagmus was well marked in nearly all the cases. One patient, an old lady, had been in contact with a case of chicken-pox. If von Economo's theory is correct, there is no reason why a virus should not crop out along the course of the vestibular division of the eighth nerve, although I have never heard of epidemic labyrinthitis. It would be interesting to hear whether any of your readers have had a similar experience.

Frigidity after Childbirth

"M. M." writes in reply to "Doctor" (July 29, p. 263): It is possible that the type of contraceptive may be unsatisfactory in this case as (1) providing an excess of lubricant, or (2) being aesthetically unacceptable to the patient. The first could be avoided by the use of a check pessary of the occlusive type, and the second by the use of an appliance that the patient does not have to handle herself—for example, a rubber sheath.

Income Tax

Cash Basis: Retirement of Partner

"ALPHA" was the senior partner in the firm of A. and B.: A. has retired and B. is carrying on the practice with an assistant. They have elected to be treated as if the practice had been discontinued and recommenced. How should they treat cash received for work done prior to the date of dissolution of the partnership?

*** The cash-basis assessments in the past have covered the liability for the work done in the years for which assessments have been made (the gross cash receipts having been assumed to be equal to the gross bookings less bad debts), and subsequent receipts are not as such chargeable to tax on either partner. A.'s liability ceases as from the date of his retirement; B.'s will start from that date in respect of his "sale" practice and he will be assessable at first on the current year's basis. Consequently no assessment would normally be made on him until he has completed a year's work, and his profit will be measured by the gross *earnings* (bookings less bad debts) less his expenses, including the cost of the assistant. (If B. desires it the inspector might continue the cash basis, and *for that purpose only* he would then have to bring in as a measure of the gross earnings *all* cash, including that for past work, even though it is paid over to his former partner.)

LETTERS, NOTES, ETC.

Treatment of Burns

Mr. C. W. R. PRICE (Exeter) writes: Two years ago Dr. J. M. Bryson, who was then a house-surgeon at the Royal Salop Infirmary, introduced me to the "lazy man's treatment" for burns, and as this method has stood me in good stead in many cases since I think that a short note in the *Journal* may be useful to other surgeons. The method simply consists of using tannic acid powder in place of the aqueous or oily solutions of tannic acid usually employed. The burn is cleaned in the ordinary way, and the powder then shaken on to it from a canister or bag of wide-meshed gauze. The exuding serum rapidly forms a coagulum with the tannic acid and no further applications are necessary. This method is also of value in the treatment of the severe facial and other abrasions occurring in road accidents, preliminary cleaning being followed by application of the powder in the same way.

Treatment of "Meta Fuel" Poisoning

ELMESAN (LONDON) LTD., referring to recent correspondence on poisoning from ingestion of "meta fuel"—metaldehyde (CH_3COH)—ask leave to inform members of the medical profession of the details of a procedure recommended by Dr. Laszlo Wamoscher of Berlin: (1) Immediate wash-outs of the stomach with large quantities of sodium bicarbonate solution. These should be repeated frequently, and performed slowly for the first time on account of the development of CO_2. (2) High colon wash-outs of the bowels with alkaline solutions. (3) Purgatives after washing out: Glauber's salt or castor oil. No phenolphthalein or acids. (4) Large quantities of charcoal, preferably wood charcoal. (5) For the heart: caffeine and, if necessary, strophanthin intravenously. (6) No narcotics, if possible. Against the cramps becoming too intensive: the sodium salt of veronal. (7) Intravenous injections of calcium (Sandoz), and repeated intravenous injections of 30 to 40 per cent. glucose.

Tempora Mutantur ?

Dr. ERIC GARDNER (Weybridge) writes: Your sympathetic obituary notice on the late Dr. Havelock Ellis reminds me that not only did his work meet with disapproval in the law courts, but it is not so long ago that the open discussion of sexual matters was frowned on even in the columns of the *British Medical Journal*. I can well remember reading a review of Kraft-Ebing's *Psychopatha Sexualis*, published between 1896 and 1900, when I was at Cambridge. Your reviewer deplored the publication of such a work and in vitriolic phrases pilloried author, translator, publisher, and printer, but his concluding sentence has always remained in my mind. It was to this effect: "Finally with regard to the paper on which this book is printed, we only hope it may be put to the basest use to which paper can be applied."

Sir James McGrigor and the Aberdeen Medical Society

Dr. JOHN CRAIG (Aberdeen) writes: May I point out to the reviewer of the *Book of Aberdeen* that Sir James McGrigor WAS a *founder* of the Aberdeen Medical Society—as is distinctly pointed out in the article in paragraphs 2 and 3.